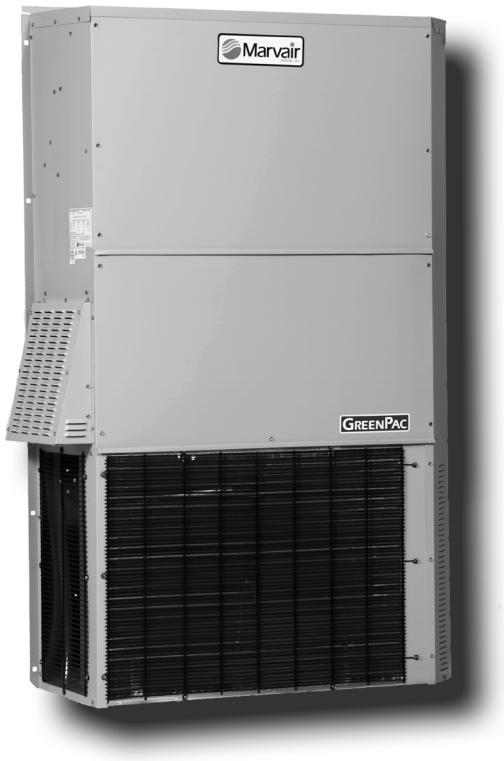
Marvair™
AIRXCEL®, Inc.
ISO 9001 2000 REGISTERED COMPANY

Product Manual

GreenPac™ and GreenPac HGR™ Vertical Wall Mount Heat Pumps and Air Conditioners



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How to Use This Manual

This manual is intended to be a comprehensive guide to Marvair's GreenPac™ & GreenPac HGR™ line of vertical packaged air conditioners and heat pumps. It contains installation, troubleshooting, maintenance, warranty, and application information. The information contained in this manual is to be used by the installer as a guide only. This manual does not supercede or circumvent any applicable national or local codes.

If you are installing the GreenPac™ or GreenPac HGR™ air conditioner or heat pump, first read Chapter 1 and scan the entire manual before beginning the installation as described in Chapter 2. Chapter 1 contains general, descriptive information and provides an overview which can speed up the installation process and simplify troubleshooting.

If a malfunction occurs, follow this troubleshooting sequence:

1. Make sure you understand how the unit works (Chapters 1 & 3).

2. Identify and correct installation errors (Chapter 2).

3. Refer to the troubleshooting information in Chapter 4.

4. Identify defective part(s) (Chapter 5).

If you are still unable to correct the problem, contact the Factory for additional assistance.

Please read the following "Important Safety Precautions" before beginning any work.

Important Safety Precautions

1. USE CARE when LIFTING or TRANSPORTING equipment.

2. TRANSPORT the UNIT UPRIGHT. Laying it down on its side may cause oil to leave the compressor, resulting in DAMAGE upon START-UP.

3. TURN ELECTRICAL POWER OFF AT THE breaker or fuse box BEFORE installing or working on the equipment. LINE VOLTAGES ARE HAZARDOUS or LETHAL.

4. OBSERVE and COMPLY with ALL applicable PLUMBING, ELECTRICAL, and BUILDING CODES & ordinances.

5. SERVICE may be performed ONLY by QUALIFIED and EXPERIENCED PERSONS.

   *** Wear safety goggles when servicing the refrigeration circuit**
   *** Beware of hot surfaces on refrigerant circuit components**
   *** Beware of sharp edges on sheet metal components**
   *** Use care when recovering or adding refrigerant**

Specifications subject to change without notice.
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Chapter 1

GreenPac™ and GreenPac HGR ™ Air Conditioners and Heat Pumps Description and Specifications

1.1 General Description

The Marvair™ GreenPac™ and GreenPac HGR™ (Hot Gas Reheat) air conditioners and heat pumps are complete, factory assembled systems designed to provide total comfort while meeting ventilation requirements. The GreenPac and GreenPac HGR A/C and HPs are built in cooling capacities of 2 ton to 5 tons (24,000 BTUH to 60,000 BTUH). Optional electric heat is available on all models. The GreenPac and GreenPac HGR units both have the factory installed Marvair™ GreenWheel® ERV. The GreenWheel® ERV is a total energy wheel that can recover both sensible and latent heat with efficiencies of up to 75%. The use of the GreenWheel® ERV allows compliance with ASHRAE standard 62-1999 ventilation requirements while keeping operating costs to a minimum.

GreenPac HGR™ Air Conditioner or Heat Pump - In addition to the factory installed GreenWheel® ERV, the GreenPac HGR unit has a Hot Gas Reheat coil. The GreenPac HGR unit provides additional dehumidification capability by working in conjunction with the GreenWheel® ERV. The HGR coil permits dehumidification of the fresh and return air without overcooling the classroom. The operation of the HGR coil is controlled by humidity controller or BAS control.

The GreenPac™ and GreenPac HGR™ air conditioners and heat pumps are listed by ETL and tested in accordance with UL Standard 1995, 2nd Ed. Ratings and specifications are in accordance with the applicable standards of the Air Conditioning and Refrigeration Institute.

These instructions explain the recommended methods for installing the GreenPac™ and GreenPac HGR™ air conditioners and heat pumps and making the electrical wiring connections to the unit. All internal wiring is complete. The refrigeration system has been factory charged and sealed. Service ports have been provided for field service if required.

MODEL IDENTIFICATION

AVP • • • • • •

Air Source **V**ertical **P**ackage

Nominal Cooling
24 = 24,000 BTUH
30 = 30,000 BTUH
36 = 36,000 BTUH
42 = 42,500 BTUH
48 = 50,000 BTUH
60 = 58,000 BTUH

System Type
AC = Air Conditioner
HP = Heat Pump

Power Supply
A = 208/230V, 1 Ph, 60 Hz
C = 208/230V, 3 Ph, 60 Hz
D = 460V, 3 Ph, 60 Hz

Electric Heat
00 (None) 8 kW
4 kW 9 kW
5 kW 10 kW
6 kW 15 kW

Configuration
H = GreenWheel® ERV

Special Option Code
G = HGR (Hot Gas Reheat)

SERIAL NUMBER DATE CODE

A = January	J = September	L = 2000	V = 2008
B = February	K = October	M = 2001	W = 2009
C = March	L = November	N = 2002	
D = April	M = December	P = 2003	
E = May		R = 2004	
F = June		S = 2005	
G = July		T = 2006	
H = August		U = 2007	

1.2 Ratings & Specifications

GreenPac™ & GreenPac HGR™ Air Conditioners

Cooling Performance Chart (BTUH) - GreenPac™ & GreenPac HGR™ Air Conditioners

	OUTDOOR AMBIENT DRY BULB TEMPERATURES								
MODEL	75°F	80°F	85°F	90°F	95°F	100°F	105°F	110°F	115°F
24	25,900	25,600	24,900	24,400	24,000	23,000	22,500	21,900	21,100
30	33,000	32,300	31,200	30,300	29,400	28,500	28,000	27,100	26,200
36	38,700	38,200	37,200	36,100	35,600	34,300	33,400	32,400	31,200
42	46,200	45,600	44,600	43,000	41,500	39,900	37,900	35,200	33,000
48	51,900	50,700	49,700	48,900	48,000	45,500	42,800	40,500	38,600
60	61,600	60,200	59,000	58,100	57,000	53,600	50,700	47,900	45,600

Rated indoor air flow at 80°F DB/67°F WB indoor.

Electrical Characteristics - GreenPac™ & GreenPac HGR™ Air Conditioners

BASIC	COMPRESSOR				OUTDOOR FAN MOTOR					INDOOR FAN MOTOR					GREENWHEEL		
MODEL	VOLTS	Hz/Ph	RLA	LRA	VOLTS	Hz/Ph	RPM	FLA	HP	VOLTS	Hz/Ph	RPM	FLA	HP	VOLTS	Hz/Ph	RLA
AVP24ACA	208/230	60/1	11.6	60	208/230	60/1	1075	1.5	1/5	208/230	60/1	1075	1.4	1/5	208/230	60/1	2.2
AVP30ACA	208/230	60/1	14.7	73	208/230	60/1	1075	1.8	1/4	208/230	60/1	1100	2.5	1/4	208/230	60/1	2.2
AVP36ACA	208/230	60/1	15.6	78.8	208/230	60/1	1075	1.8	1/4	208/230	60/1	1100	2.5	1/4	208/230	60/1	2.2
AVP42ACA	208/230	60/1	19.2	87	208/230	60/1	825	2.8	1/3	208/230	60/1	1075	3.1	1/2	208/230	60/1	2.2
AVP48ACA	208/230	60/1	21.8	105	208/230	60/1	825	2.8	1/3	208/230	60/1	1075	3.1	1/2	208/230	60/1	2.2
AVP60ACA	208/230	60/1	24.5	135	208/230	60/1	825	2.8	1/6	208/230	60/1	1075	5.2	3/4	208/230	60/1	2.2
AVP24ACC	208/230	60/3	8.7	58	208/230	60/1	1075	1.5	1/5	208/230	60/1	1075	1.4	1/5	208/230	60/1	2.2
AVP30ACC	208/230	60/3	9.3	68	208/230	60/1	1075	1.8	1/4	208/230	60/1	1100	2.5	1/4	208/230	60/1	2.2
AVP36ACC	208/230	60/3	10.9	78	208/230	60/1	1075	1.8	1/4	208/230	60/1	1100	2.5	1/4	208/230	60/1	2.2
AVP42ACC	208/230	60/3	14.1	110	208/230	60/1	825	2.8	1/3	208/230	60/1	1075	3.1	1/2	208/230	60/1	2.2
AVP48ACC	208/230	60/3	14.1	130	208/230	60/1	825	2.8	1/3	208/230	60/1	1075	3.1	1/2	208/230	60/1	2.2
AVP60ACC	208/230	60/3	16	137	208/230	60/1	825	2.8	1/3	208/230	60/1	1075	5.2	3/4	208/230	60/1	2.2
AVP24ACD	460	60/3	3.2	30	208/230	60/1	1075	1.5	1/5	208/230	60/1	1075	1.4	1/5	208/230	60/1	2.2
AVP30ACD	460	60/3	5	36	208/230	60/1	1075	1.8	1/4	208/230	60/1	1100	2.5	1/4	208/230	60/1	2.2
AVP36ACD	460	60/3	5.8	40	208/230	60/1	1075	1.8	1/4	208/230	60/1	1100	2.5	1/4	208/230	60/1	2.2
AVP42ACD	460	60/3	7	32.8	208/230	60/1	825	2.8	1/3	208/230	60/1	1075	3.1	1/2	208/230	60/1	2.2
AVP48ACD	460	60/3	7.1	54	208/230	60/1	825	2.8	1/3	208/230	60/1	1075	3.1	1/2	208/230	60/1	2.2
AVP60ACD	460	60/3	8.4	69	208/230	60/1	825	2.8	1/3	208/230	60/1	1075	5.2	3/4	208/230	60/1	2.2

RLA = Rated Load Amps LRA = Locked Rotor Amps FLA = Full Load Amps RPM = Revolutions Per Minute HP = Horsepower

Unit Load Amps - GreenPac™ & GreenPac HGR™ Air Conditioners

BASIC	AIR COND.	LOAD OF RESISTIVE HEATING ELEMENTS ONLY*							TOTAL HEATING AMPS (MAX.)						
MODEL	AMPS (MAX.)	04 kW	05 kW	06 kW	08 kW	09 kW	10 kW	15 kW	04 kW	05 kW	06 kW	08 kW	09 kW	10 kW	15 kW
AVP24ACA	16.7	16.67		25	33.33		41.67		20.27		28.6	36.93		45.27	
AVP30ACA	21.2		20.83	25			41.67	62.5		25.53	29.7			46.37	67.2
AVP36ACA	22.1		20.83	25			41.67	62.5		25.53	29.7			46.37	67.2
AVP42ACA	27.3		20.83	25			41.67	62.5		26.13	30.3			46.97	67.8
AVP48ACA	29.9		20.83				41.67	62.5		26.13				46.97	67.8
AVP60ACA	35.7		20.83				41.67	62.5		28.23				49.07	69.9
AVP24ACC	13.8			14.43		21.65					18.03		25.25		
AVP30ACC	15.8			14.43		21.65		36.08			19.13		26.35		40.78
AVP36ACC	17.4			14.43		21.65		36.08			19.13		26.35		40.78
AVP42ACC	22.2			14.43		21.65		36.08			19.73		26.95		41.38
AVP48ACC	22.2					21.65		36.08					26.95		41.38
AVP60ACC	27.2					21.65		36.08					29.05		43.48
AVP24ACD	8.3			7.22		10.83					10.82		14.43		
AVP30ACD	11.5			7.22		10.83		18.04			11.92		15.53		22.74
AVP36ACD	12.3			7.22		10.83		18.04			11.92		15.53		22.74
AVP42ACD	15.1			7.22		10.83		18.04			12.52		16.13		23.34
AVP48ACD	15.2					10.83		18.04					16.13		23.34
AVP60ACD	19.6					10.83		18.04					18.23		25.44

* In Amps

Heating kW shown for 240V for all HPA and HPC models. Derate by 25% for 208V service. Total heating amps for all HPA (208/230V 1ø) units with 8 kW and larger includes both circuits (#1 and #2). Heating kW shown for 480 for all HPD models. NOTE: Three phase equipment (HPC and HPD models) contain single-phase motor loads. Values shown are maximum phase loads. Loads are not equally balanced on each phase. Total heating amps includes motor loads.

Efficiency and Capacity Ratings for GreenPac™ & GreenPac HGR™ A/Cs

MODEL	AVP24	AVP30	AVP36	AVP42	AVP48	AVP60
COOLING BTUH	24,000	29,400	35,600	41,500	48,000	57,000
DESIGNATOR	C1	C1	C1	B1	B1	D1
SEER	10.1	10.2	10	10.2	10.2	10
RATED CFM	850	1,000	1,220	1,520	1,760	1,850
ESP	0.1	0.15	0.15	0.15	0.2	0.2

Note: Based upon ARI Standard 210/240 conditions. All performance and capacity ratings are for a 60 Hz power supply. Ratings are also affected by altitude.

Sensible to Total Ratio @ 95°F Dry Bulb Outside Air for GreenPac™ Air Conditioners

MODEL	24	30	36	42	48	60
TOTAL CAPACITY (BTUH)	24,000	29,400	35,600	41,500	48,000	57,000
SENSIBLE HEAT RATIO	0.76	0.78	0.76	0.8	0.8	0.8
SENSIBLE CAPACITY (BTUH)	18,240	22,930	27,060	33,200	38,400	45,600

Sensible ratios based on ARI Standard 210/240 Indoor Conditions of 80°F DB/67°F WB.

Sensible to Total Ratio @ 95°F Dry Bulb Outside Air for GreenPac HGR™ Air Conditioners

	MODEL	24	30	36	42	48	60
NON-ACTIVE HGR	TOTAL CAPACITY (BTUH)	24,000	29,400	35,600	41,500	48,000	57,000
	SENSIBLE HEAT RATIO	0.76	0.78	0.76	0.8	0.8	0.8
	SENSIBLE CAPACITY (BTUH)	18,240	22,930	27,060	33,200	38,400	45,600
ACTIVE HGR	TOTAL CAPACITY (BTUH)	11,400	13,800	16,800	19,600	22,600	26,800
	SENSIBLE HEAT RATIO	0.55	0.565	0.55	0.58	0.58	0.58
	SENSIBLE CAPACITY (BTUH)	6,270	7,800	9,240	11,370	13,110	15,540
	LATENT CAPACITY	5,130	6,000	7,560	8,230	9,490	11,260

SenSensible ratios based on ARI Standard 240 Indoor Conditions of 80°F DB/67°F WB.

GreenPac™ & GreenPac HGR™ A/Cs
Air Volume (CFM) at Various Static Pressures

	Cubic Feet/Minute		
MODEL	.10 IWG	.20 IWG	.30 IWG
24	850	810	670
30	1,100	1,000	920
36	1,310	1,220	1,150
42	–––	1,650	1,520
48	–––	1,900	1,760
60	–––	1,900	1,760

IWG = Inches Water Gauge CFM = Cubic Feet/Minute

GreenPac™ & GreenPac HGR™ Heat Pumps

Cooling Performance Chart (BTUH) - GreenPac™ & GreenPac HGR™ Heat Pumps

	OUTDOOR AMBIENT DRY BULB TEMPERATURES								
MODEL	75°F	80°F	85°F	90°F	95°F	100°F	105°F	110°F	115°F
24	27,100	26,500	25,600	24,700	24,000	23,400	21,800	20,700	19,500
30	33,500	32,600	31,700	30,800	30,000	28,600	26,200	24,800	23,200
36	38,300	37,400	37,000	36,200	35,600	33,900	32,200	30,500	29,100
42	45,900	45,400	43,800	43,000	42,500	39,500	37,600	35,700	34,100
48	54,900	54,200	53,100	51,800	50,000	47,900	44,900	42,700	40,800
60	63,800	63,000	61,300	58,300	56,500	54,800	53,600	51,600	48,500

Rated indoor air flow at 80°F DB/67°F WB indoor.

Heating Performance Chart (BTUH) - GreenPac™ & GreenPac HGR™ Heat Pumps

	OUTDOOR AMBIENT DRY BULB TEMPERATURES							
MODEL	10°F	20°F	30°F	40°F	47°F	50°F	60°F	70°F
24	12,000	14,500	16,700	20,100	23,600	24,500	26,000	27,600
30	17,600	20,000	22,000	27,100	30,800	31,100	32,000	34,300
36	18,900	22,100	26,000	31,100	36,000	37,000	38,400	39,900
42	21,300	24,900	30,100	36,500	42,500	43,300	45,300	47,500
48	25,000	29,100	35,800	42,200	49,500	50,200	51,500	56,200
60	29,500	33,600	41,000	49,800	57,500	58,600	61,500	63,700

Rated indoor air flow at 70°F DB indoor.

Electrical Characteristics - GreenPac™ & GreenPac HGR™ Heat Pumps

BASIC	COMPRESSOR				OUTDOOR FAN MOTOR					INDOOR FAN MOTOR					GREENWHEEL		
MODEL	VOLTS	Hz/Ph	RLA	LRA	VOLTS	Hz/Ph	RPM	FLA	HP	VOLTS	Hz/Ph	RPM	FLA	HP	VOLTS	Hz/Ph	RLA
AVP24HPA	208/230	60/1	12.8	61	208/230	60/1	1075	1.5	1/5	208/230	60/1	1075	1.4	1/5	208/230	60/1	2.2
AVP30HPA	208/230	60/1	14.8	73	208/230	60/1	1075	1.8	1/4	208/230	60/1	1100	2.5	1/4	208/230	60/1	2.2
AVP36HPA	208/230	60/1	18	87	208/230	60/1	1075	1.8	1/4	208/230	60/1	1100	2.5	1/4	208/230	60/1	2.2
AVP42HPA	208/230	60/1	21.8	105	208/230	60/1	825	2.8	1/3	208/230	60/1	1075	3.1	1/2	208/230	60/1	2.2
AVP48HPA	208/230	60/1	24.4	135	208/230	60/1	825	2.8	1/3	208/230	60/1	1075	3.1	1/2	208/230	60/1	2.2
AVP60HPA	208/230	60/1	28.2	135	208/230	60/1	825	2.8	1/3	208/230	60/1	1075	3.1	1/2	208/230	60/1	2.2
AVP24HPC	208/230	60/3	9	58	208/230	60/1	1075	1.5	1/5	208/230	60/1	1075	1.4	1/5	208/230	60/1	2.2
AVP30HPC	208/230	60/3	9.6	68	208/230	60/1	1075	1.8	1/4	208/230	60/1	1100	2.5	1/4	208/230	60/1	2.2
AVP36HPC	208/230	60/3	13.5	110	208/230	60/1	1075	1.8	1/4	208/230	60/1	1100	2.5	1/4	208/230	60/1	2.2
AVP42HPC	208/230	60/3	14.1	130	208/230	60/1	825	2.8	1/3	208/230	60/1	1075	3.1	1/2	208/230	60/1	2.2
AVP48HPC	208/230	60/3	16	137	208/230	60/1	825	2.8	1/3	208/230	60/1	1075	3.1	1/2	208/230	60/1	2.2
AVP60HPC	208/230	60/3	17.8	150	208/230	60/1	825	2.8	1/3	208/230	60/1	1075	3.1	1/2	208/230	60/1	2.2
AVP24HPD	460	60/3	4.2	30	208/230	60/1	1075	1.5	1/5	208/230	60/1	1075	1.4	1/5	208/230	60/1	2.2
AVP30HPD	460	60/3	5.5	36	208/230	60/1	1075	1.8	1/4	208/230	60/1	1100	2.5	1/4	208/230	60/1	2.2
AVP36HPD	460	60/3	6.4	54	208/230	60/1	1075	1.8	1/4	208/230	60/1	1100	2.5	1/4	208/230	60/1	2.2
AVP42HPD	460	60/3	7.1	64	208/230	60/1	825	2.8	1/3	208/230	60/1	1075	3.1	1/2	208/230	60/1	2.2
AVP48HPD	460	60/3	8.3	69	208/230	60/1	825	2.8	1/3	208/230	60/1	1075	3.1	1/2	208/230	60/1	2.2
AVP60HPD	460	60/3	9.6	75	208/230	60/1	825	2.8	1/3	208/230	60/1	1075	3.1	1/2	208/230	60/1	2.2

RLA = Rated Load Amps LRA = Locked Rotor Amps FLA = Full Load Amps RPM = Revolutions Per Minute HP = Horsepower

Unit Load Amps - GreenPac™ & GreenPac HGR™ Heat Pumps

BASIC	HEAT PUMP	LOAD OF RESISTIVE HEATING ELEMENTS ONLY*							TOTAL HEATING AMPS (MAX.)						
MODEL	AMPS (MAX.)	04 kW	05 kW	06 kW	08 kW	09 kW	10 kW	15 kW	04 kW	05 kW	06 kW	08 kW	09 kW	10 kW	15 kW
AVP24HPA	17.9	16.7			33.3				34.6			51.2			
AVP30HPA	21.3		20.8				41.7	62.5		42.1				63	83.8
AVP36HPA	24.5		20.8				41.7	62.5		45.3				66.2	87
AVP42HPA	29.9		20.8				41.7	62.5		50.7				71.6	71.6
AVP48HPA	32.5		20.8				41.7	62.5		53.3				74.2	74.2
AVP60HPA	36.3		20.8				41.7	62.5		57.1				78	78
AVP24HPC	14.1			14.4							28.5				
AVP30HPC	16.1			14.4		21.7		36.1			30.5		37.8		52.2
AVP36HPC	20			14.4		21.7		36.1			34.4		41.7		56.1
AVP42HPC	22.2			14.4		21.7		36.1			36.6		43.9		58.3
AVP48HPC	24.1					21.7		36.1					45.8		60.2
AVP60HPC	25.9					21.7		36.1					47.6		62
AVP24HPD	9.3			7.22							16.5				
AVP30HPD	12			7.22		10.8		18			19.2		22.8		30
AVP36HPD	12.9			7.22		10.8		18			20.1		23.7		30.9
AVP42HPD	15.2			7.22		10.8		18			22.4		26		33.2
AVP48HPD	16.4					10.8		18					27.2		34.4
AVP60HPD	17.7					10.8		18					28.5		35.7

*In Amps

Heating kW shown for 240V for all HPA and HPC models. Derate by 25% for 208V service. Total heating amps for all HPA (208/230V 1ø) units with 8 kW and larger includes both circuits (#1 and #2). Heating kW shown for 480 for all HPD models. NOTE: Three phase equipment (HPC and HPD models) contain single-phase motor loads. Values shown are maximum phase loads. Loads are not equally balanced on each phase. Total heating amps includes motor loads.

Efficiency and Capacity Ratings for GreenPac™ & GreenPac HGR™ HPs

MODEL	AVP24	AVP30	AVP36	AVP42	AVP48	AVP60
COOLING BTUH	24,000	30,000	35,600	42,500	50,000	56,500
DESIGNATOR	B1	B1	C1	B1	C1	C1
SEER	10	10	10	10.2	10.2	10
HTG HI TEMP BTUH	23,600	30,800	36,000	42,500	49,500	57,500
HTG HI TEMP COP	2.7	2.8	2.7	2.8	2.8	2.8
HTG LO TEMP BTUH	13,600	18,200	21,000	23,800	28,000	34,000
HTG LO TEMP COP	1.9	2	2	1.9	1.9	2
HSPF REGION IV	6.6	6.7	6.9	6.6	6.7	6.6
RATED CFM	850	1,000	1,200	1,520	1,760	1,875
ESP	0.1	0.15	0.15	0.15	0.2	0.2

Note: Based upon ARI Standard 210/240 conditions. Ratings are also affected by altitude.

Sensible to Total Ratio @ 95°F Dry Bulb Outside Air for GreenPac™ Heat Pumps

MODEL	24	30	36	42	48	60
TOTAL CAPACITY (BTUH)	24,000	30,000	35,600	42,500	50,000	56,500
SENSIBLE HEAT RATIO	0.755	0.775	0.76	0.8	0.8	0.795
SENSIBLE CAPACITY (BTUH)	18,120	23,250	27,060	34,000	40,000	44,920

Sensible ratios based on ARI Standard 210/240 Indoor Conditions of 80°F DB/67°F WB.

Sensible to Total Ratio @ 95°F Dry Bulb Outside Air for GreenPac HGR™ Heat Pumps

	MODEL	24	30	36	42	48	60
NON-ACTIVE HGR	TOTAL CAPACITY (BTUH)	24,000	30,000	35,600	42,500	50,000	56,500
	SENSIBLE HEAT RATIO	0.755	0.775	0.76	0.8	0.8	0.795
	SENSIBLE CAPACITY (BTUH)	18,120	23,250	27,060	34,000	40,000	44,920
ACTIVE HGR (DEHUMIDIFICATION)	TOTAL CAPACITY (BTUH)	11,200	14,200	16,800	20,000	23,600	26,600
	SENSIBLE HEAT RATIO	0.545	0.56	0.55	0.58	0.58	0.575
	SENSIBLE CAPACITY (BTUH)	6,100	7,950	9,240	11,600	13,690	15,300
	LATENT CAPACITY (BTUH)	5,100	6,250	7,560	8,400	9,910	11,300

Sensible ratios based on ARI Standard 240 Indoor Conditions of 80°F DB/67°F WB.

GreenPac™ & GreenPac HGR™ HPs
Air Volume (CFM) at Various Static Pressures

	Cubic Feet/Minute		
MODEL	.10 IWG	.20 IWG	.30 IWG
24	850	810	670
30	1,100	1,000	920
36	1,310	1,220	1,150
42	–––	1,650	1,520
48	–––	1,875	1,760
60	–––	1,875	1,760

IWG = Inches Water Gauge CFM = Cubic Feet/Minute

GreenPac™ & GreenPac HGR™ Heat Pumps with "S" Circuit

Unit Load Amps - GreenPac™ & GreenPac HGR™ Heat Pumps - "S" Circuit

BASIC	HEAT PUMP	LOAD OF RESISTIVE HEATING ELEMENTS ONLY*							TOTAL HEATING AMPS (MAX.)						
MODEL	AMPS (MAX.)	04 kW	05 kW	06 kW	08 kW	09 kW	10 kW	15 kW	04 kW	05 kW	06 kW	08 kW	09 kW	10 kW	15 kW
AVP24HPA	17.9	16.67			33.33		41.67		20.27			36.93		45.27	
AVP30HPA	21.3		20.83				41.67	62.5		25.53				46.37	67.2
AVP36HPA	24.5		20.83				41.67	62.5		25.53				46.37	67.2
AVP42HPA	29.9		20.83		33.33		41.67	62.5		26.13		38.63		46.97	67.8
AVP48HPA	32.5		20.83				41.67	62.5		26.13				46.97	67.8
AVP60HPA	36.3		20.83				41.67	62.5		26.13				46.97	67.8
AVP24HPC	14.1					21.65							25.25		
AVP30HPC	16.1					21.65		36.08					26.35		40.78
AVP36HPC	20					21.65		36.08					26.35		40.78
AVP42HPC	22.2					21.65		36.08					26.95		41.38
AVP48HPC	24.1					21.65		36.08					26.95		41.38
AVP60HPC	25.9					21.65		36.08					26.95		41.38
AVP24HPD	9.3					10.83							14.43		
AVP30HPD	12					10.83		18.04					15.53		22.74
AVP36HPD	12.9					10.83		18.04					15.53		22.74
AVP42HPD	15.2					10.83		18.04					16.13		23.34
AVP48HPD	16.4					10.83		18.04					16.13		23.34
AVP60HPD	17.7					10.83		18.04					16.13		23.34

* In Amps

*"S" Circuit – Control configuration limits electrical demand by preventing simultaneous operation of the electric heat pump and the electric heat. Heating kW shown for 240V for all HPA and HPC models. Derate by 25% for 208V service. Total heating amps for all HPA (208/30V 1ø) units with 8 kW and larger includes both circuits (#1 and #2). Heating kW shown for 480 for all HPD models. NOTE: Three phase equipment (HPC and HPD models) contain single-phase motor loads. Values shown are maximum phase loads. Loads are not equally balanced on each phase. Total heating amps includes motor loads.

FILTER SIZE

MODEL	INDOOR RETURN FILTER SIZE	
24/30/36	27-1/2" x 13-1/2" x 1"	Filament Spun Glass
42/48/60	29-1/2" x 15-1/2" x 1"	Filament Spun Glass
MODEL	**FRESH AIR FILTER SIZE**	
24/30/36	14" x 14" x 1"	Washable Organic Media
42/48/60	14" x 14" x 1"	Washable Organic Media

SHIP WEIGHT (LBS.)

	Air Conditioners		Heat Pumps	
MODEL	GreenPac™	GreenPac HGR™	GreenPac™	GreenPac HGR™
24	405	425	430	450
30	410	430	435	455
36	410	430	435	455
42	545	570	575	600
48	570	595	605	630
60	585	610	620	645

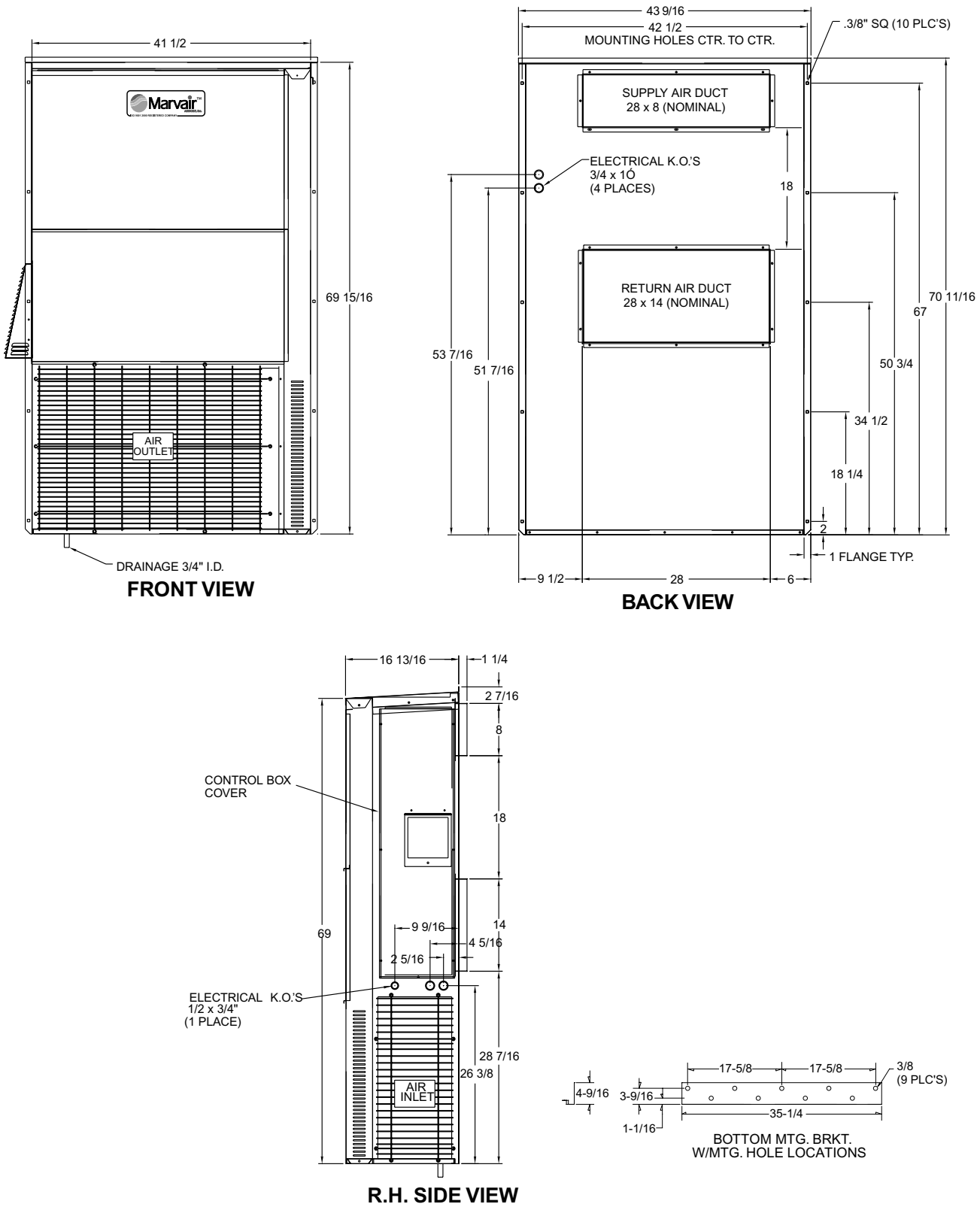


Figure 1a. GreenPac™ and GreenPac HGR™ Air Conditioners and Heat Pumps Dimensional Data - AVP24-36 (in inches)

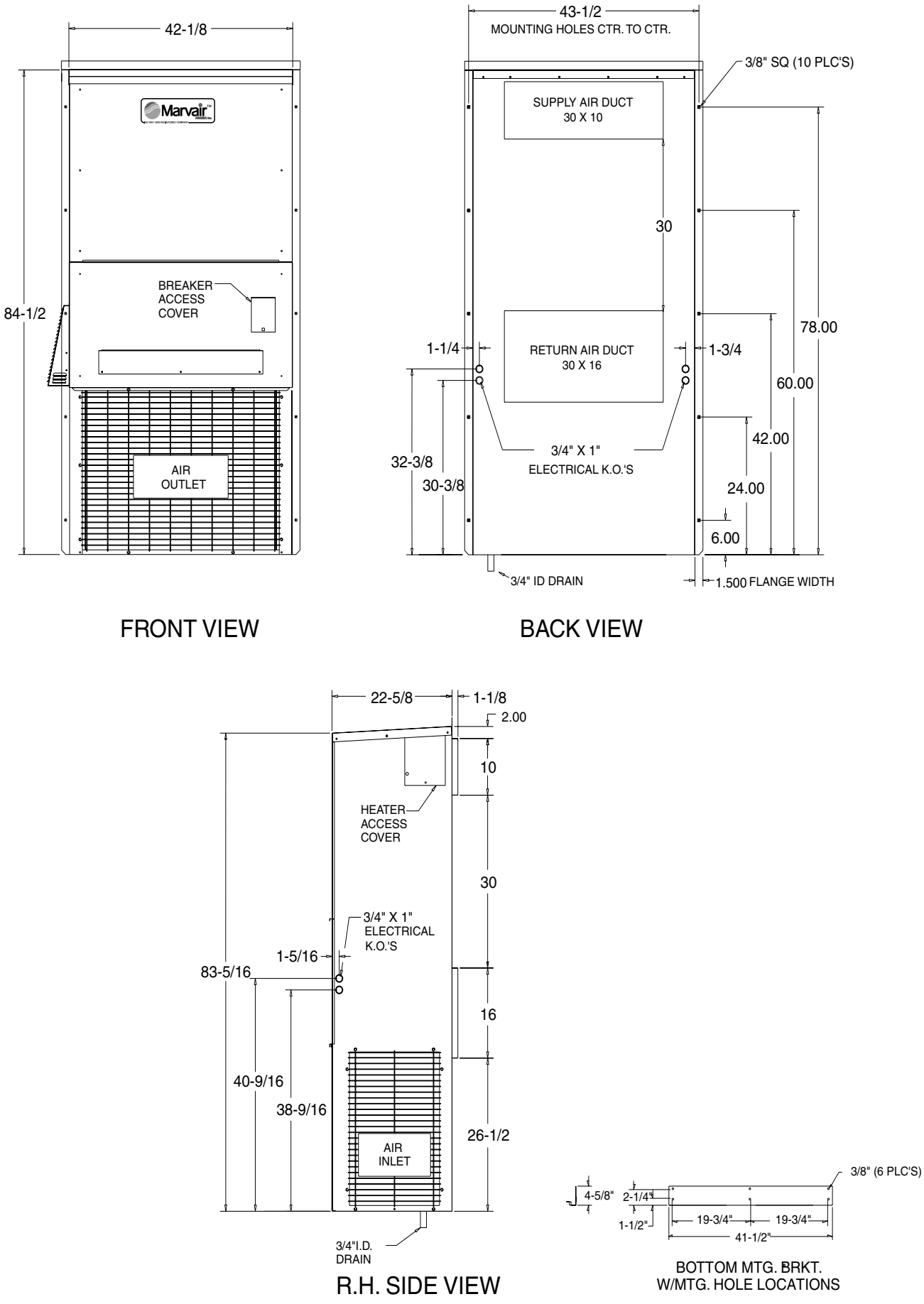


Figure 1b. GreenPac™ and GreenPac HGR™ Air Conditioners and Heat Pumps Dimensional Data - AVP42-60 (in inches)

1.3 General Operation

Refrigerant Cycle

Cooling Mode (GreenPac™ & GreenPac HGR™ Units)

The GreenPac™ and GreenPac HGR™ units use R-22 refrigerant in a conventional vapor-compression refrigeration cycle to transfer heat. In the cooling mode, a double blower assembly blows indoor air across the evaporator (indoor coil). Liquid refrigerant passing through the evaporator is boiled into gas by heat removed from the air. The warmed refrigerant gas enters the compressor where its temperature and pressure are increased. The hot refrigerant gas condenses to liquid as heat is transferred to outdoor air blown across the condenser (outdoor coil) by the condenser fan. Liquid refrigerant is metered into the evaporator through capillary tubes to repeat the cycle.

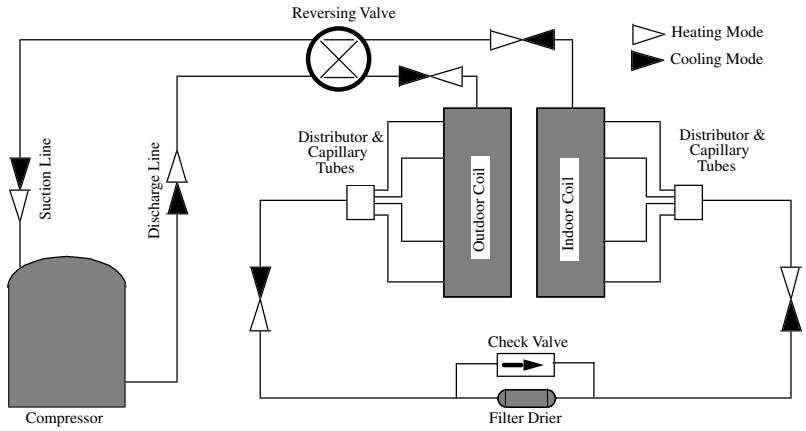


Figure 2. Refrigerant Circuit

Heating Mode (Heat Pump Models Only)

During heating mode a special reversing valve reverses the flow of refrigerant through the system exchanging the roles of the condenser and evaporator. Now the outdoor coil becomes the evaporator and the indoor coil becomes the condenser. The refrigerant then flows through the outdoor coil, picks up heat and becomes vaporized. The vapor then enters the compressor where it is compressed to a higher temperature. Next it is pumped to the indoor coil where the heat will be released into the room. The compressed refrigerant vapor will condense to its liquid state as it gives up heat. Finally, liquid flows through the capillary tube into the evaporator where the cycle will be repeated.

Optional electric strip heat is available for all models.

GreenWheel® ERV Operation

All models of the GreenPac™ and GreenPac HGR™ units have a factory installed GreenWheel® ERV ventilation assembly. The Marvair™ GreenWheel® ERV is a total energy (both sensible and latent) wheel that can reduce both construction and operating cost while ventilating the classroom to ASHRAE 62-1999 requirements. The use of the GreenWheel® ERV reduces the energy load of the outside air. Exhausting stale, inside air keeps indoor pollutants and harmful gases to a minimum. The energy recovery wheel has been tested and certified according to ARI Standard 1060.

How It Works

During the summer, cool dry air from the classroom is exhausted through the

GreenWheel® ERV to the outside. As the air passes through the rotating wheel, the desiccant becomes cooler and drier. Simultaneously, hot humid air is being pulled across the rotating wheel. The cool, dry desiccant absorbs moisture and heat from the incoming air. The cooler, drier air is mixed with the return air from the classroom and distributed throughout the room.

In the winter, warm moist air is exhausted through the GreenWheel® ERV to the outside. As the air passes through the rotating wheel, the desiccant becomes warmer and absorbs moisture. Simultaneously, cold dry air is being pulled across the rotating wheel. The cold, dry air absorbs heat and moisture from the desiccant. The warmed air is mixed with the return air from the classroom and distributed throughout the room.

Quality Components

The GreenWheel® ERV cassette consists of the wheel, two blowers and the drive motor and belt. The two blowers simultaneously pull fresh air from outside and exhaust air from the classroom through the rotating wheel. The air streams are separated by an insulated partition so that the incoming fresh air is not mixed with the exhaust air. Two variable speed blowers ensure that up to 450 CFM of outside air can be brought into the room and the indoor air is properly exhausted. Variable speed blowers permit that the desired quantity of outside air is delivered into the room. An optional independent exhaust air blower control allows positive pressurization of the classroom, i.e., more outside air can be introduced through the GreenWheel ERV than is exhausted.

Dehumidification Mode - GreenPac HGR™ Heat Pumps and Air Conditioners

When the GreenPac HGR™ A/C or HP is in the dehumidification mode, the hot gas reheat (HGR) coil is energized. The cooled, dehumidified air exits the evaporator coil and is blown through the HGR coil. This coil is sized to the sensible capacity of the unit. The heat in the HGR coil is transferred to the air stream. The use of the HGR coil allows the indoor humidity of the classroom to be maintained at or below a humidity set point without over cooling the classroom. These units can not add humidity to the classroom.

The operation of the HGR coil is controlled by a humidity controller. If the humidity rises above the set point on the controller and the temperature in the classroom is satisfied, both mechanical cooling and the HGR coil operate to temper the air and lower the humidity. If the temperature in the classroom rises above the set point of the thermostat and the unit is operating in the dehumidification mode, the need for cooling (air conditioners) or heating (heat pumps) will override the humidity controller and the HGR coil is disengaged until the thermostat is satisfied. This assures the classroom temperature is maintained as first priority and humidity control is second.

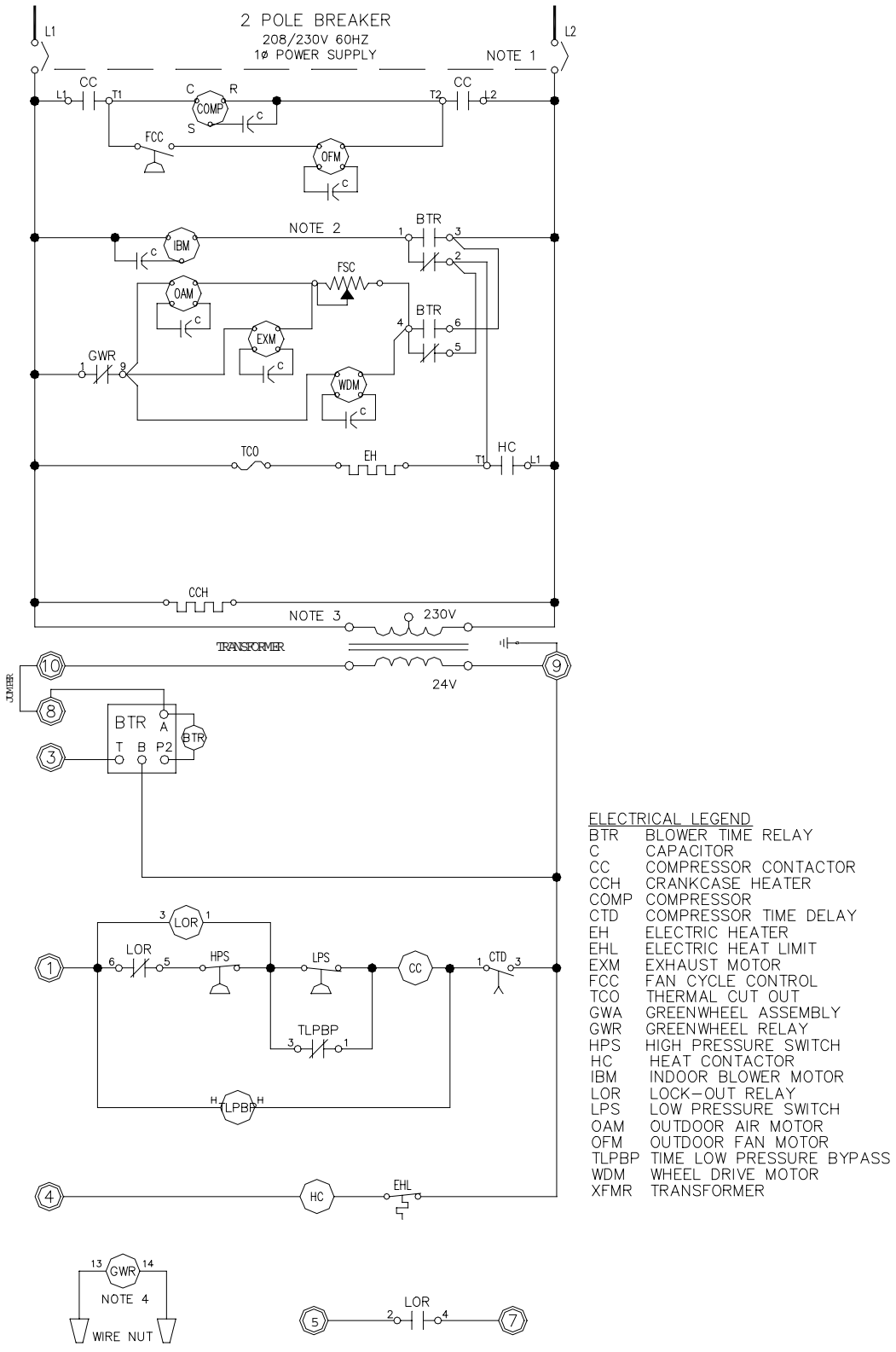
1.4 Electrical Diagrams

The compressor and condenser fan are energized with a contactor controlled by a 24 VAC pilot signal.

The condenser (outside fan) motor is energized by the same contactor.

The compressor incorporates an internal PTC crankcase heater that functions as long as primary power is available. The heater drives liquid refrigerant from the crankcase and prevents loss of lubrication caused be oil dilution. Power must be applied to the unit for 24 hours before starting the compressor.

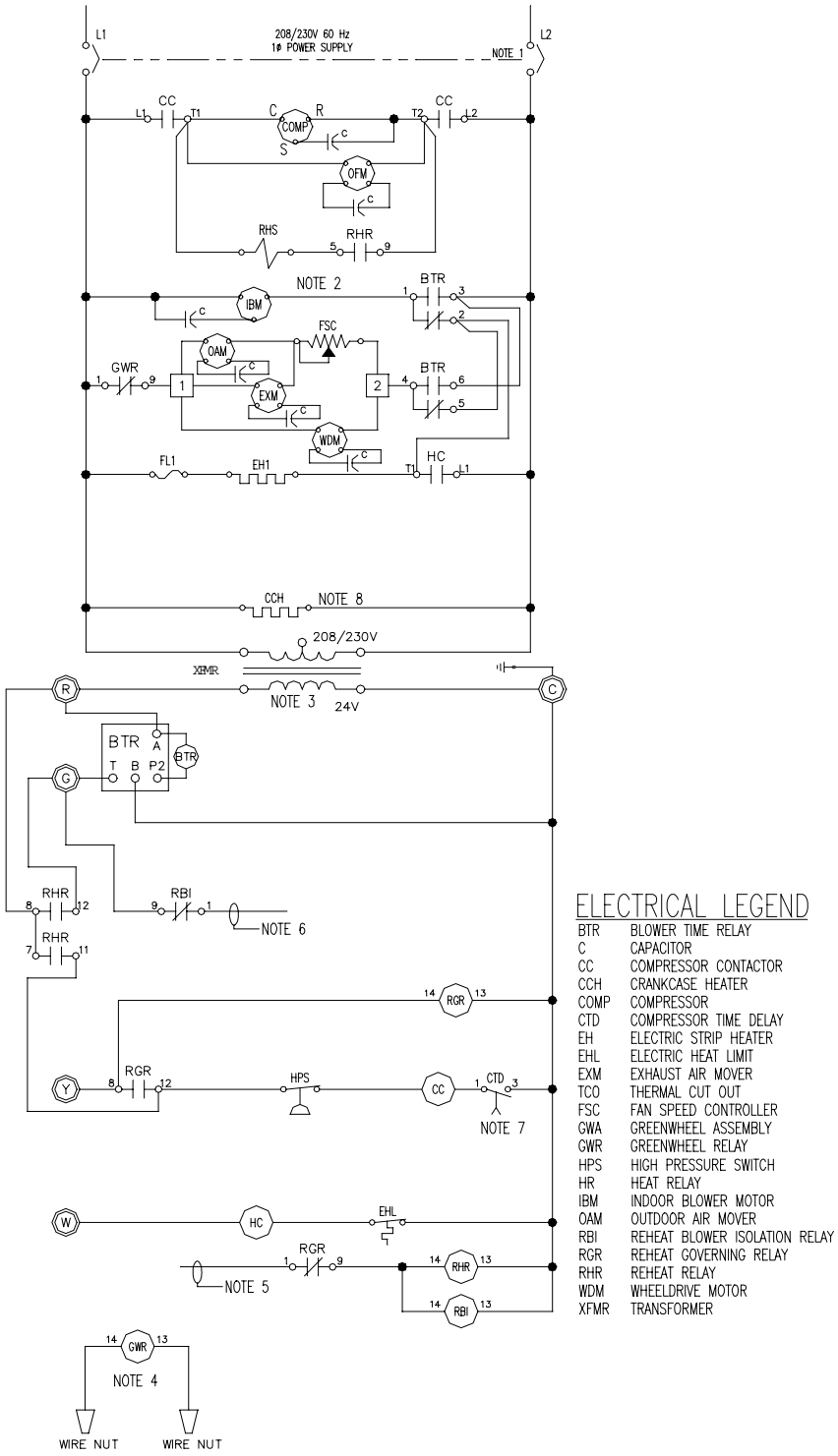
The indoor evaporator fan motor is cycled by the blower timed delay relay. See Figures 3a, 3b, 3c.



GENERAL NOTES

1. 208/230 VOLTS 60 Hz 1ø POWER SUPPLY. SEE DATA PLATE FOR AMPACITY & FUSE SIZE.
2. SPEED TAP – SEE MOTOR NAMEPLATE FOR WIRE COLOR.
3. TRANSFORMER IS FACTORY WIRED FOR 230V OPERATION: FOR 208V INTERCHANGE ORANGE & RED LEADS, INSULATE UNUSED LEADS.
4. GWR SIGNAL(VOLTAGE OPTIONAL; CHECK RELAY FOR CORRECT VOLTAGE MAY BE 24, 120 OR 240 VAC)

Figure 3a. Typical Electrical Schematic Diagram
GreenPac™ Air Conditioner



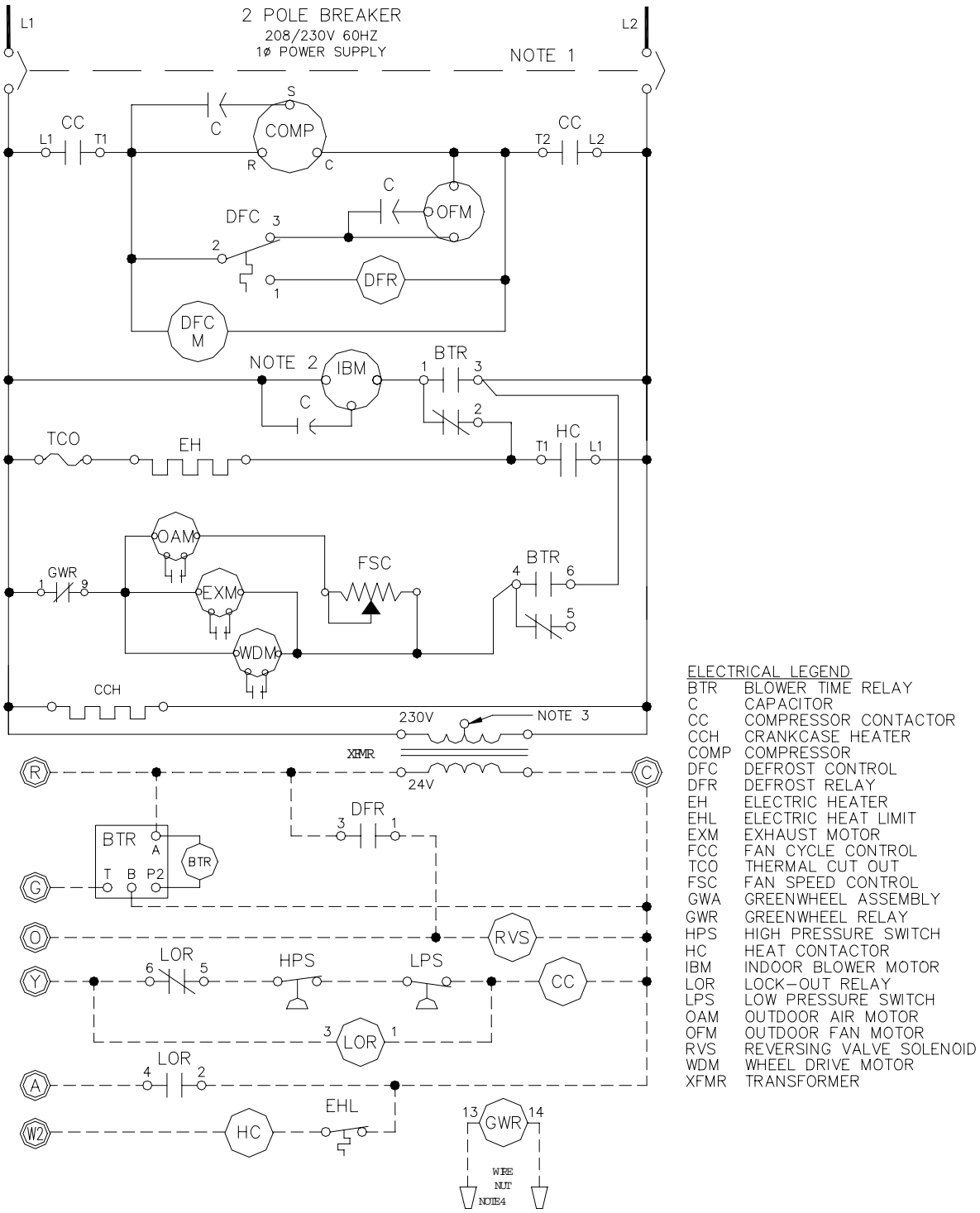
ELECTRICAL LEGEND

BTR	BLOWER TIME RELAY
C	CAPACITOR
CC	COMPRESSOR CONTACTOR
CCH	CRANKCASE HEATER
COMP	COMPRESSOR
CTD	COMPRESSOR TIME DELAY
EH	ELECTRIC STRIP HEATER
EHL	ELECTRIC HEAT LIMIT
EXM	EXHAUST AIR MOVER
TCO	THERMAL CUT OUT
FSC	FAN SPEED CONTROLLER
GWA	GREENWHEEL ASSEMBLY
GWR	GREENWHEEL RELAY
HPS	HIGH PRESSURE SWITCH
HR	HEAT RELAY
IBM	INDOOR BLOWER MOTOR
OAM	OUTDOOR AIR MOVER
RBI	REHEAT BLOWER ISOLATION RELAY
RGR	REHEAT GOVERNING RELAY
RHR	REHEAT RELAY
WDM	WHEELDRIVE MOTOR
XFMR	TRANSFORMER

GENRAL NOTES:

1. 208/230 VOLT 60 Hz 1ø POWER SUPPLY. SEE DATA PLATE FOR AMPACITY AND FUSE SIZE. HACR RATED CIRCUIT BREAKER SHOWN.
2. SPEED TAP – SEE MOTOR NAMEPLATE FOR APPROPRIATE WIRE COLOR.
3. TRANSFORMER IS FACTORY WIRED FOR 230 VOLT OPERATION. FOR 208 VOLT OPERATION, INTERCHANGE ORANGE AND RED LEADS; INSULATE UNUSED LEADS.
4. GWR COIL SIGNAL. VOLTAGE IS SPECIFIED BY OTHERS. CHECK RELAY FOR CORRECT VOLTAGE. MAY BE 24, 120 OR 240 VAC.
5. CONNECT TO YELLOW LEAD FROM H600A HUMIDISTAT. WIRE NUT WITH YELLOW LEAD LOCATED IN LOW VOLTAGE SHIELD.
6. CONNECT TO WIRE FROM "G" ON THERMOSTAT. DO NOT CONNECT THERMOSTAT LEAD DIRECTLY TO "G" ON LOW VOLTAGE TERMINAL STRIP. APPLIES TO REHEAT/DEHUMIDIFICATION UNITS ONLY. WIRE NUT WITH BROWN LEAD LOCATED IN LOW VOLTAGE SHIELD.
7. SET TIME DELAY AT 3 MINUTES MINIMUM.
8. CRANKCASE HEATER MAY NOT BE REQUIRED ON ALL COMPRESSORS.

Figure 3b. Typical Electrical Schematic Diagram
GreenPac HGR™ Air Conditioner



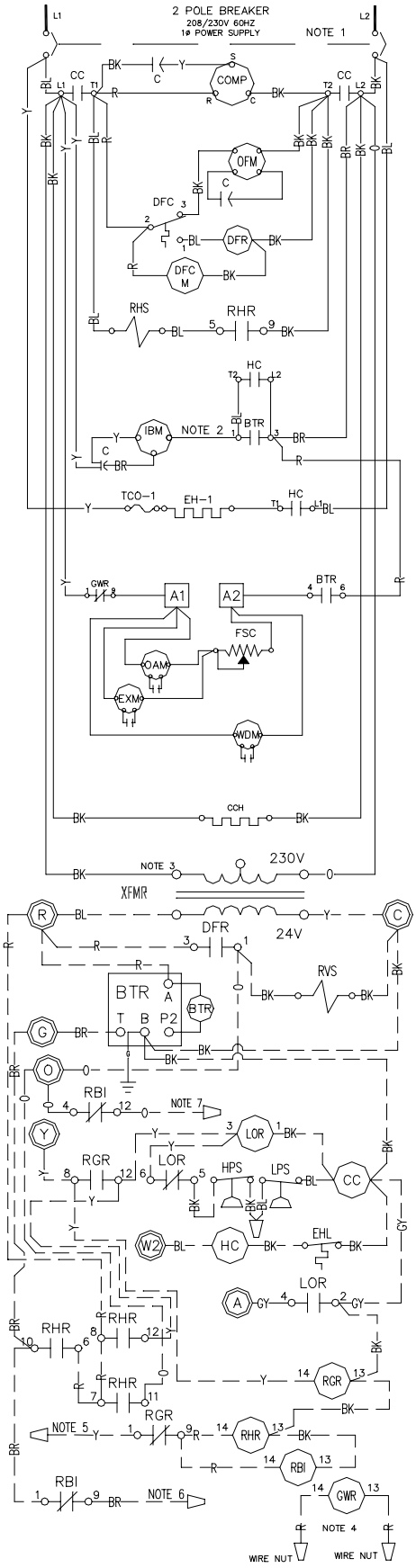
ELECTRICAL LEGEND

BTR	BLOWER TIME RELAY
C	CAPACITOR
CC	COMPRESSOR CONTACTOR
CCH	CRANKCASE HEATER
COMP	COMPRESSOR
DFC	DEFROST CONTROL
DFR	DEFROST RELAY
EH	ELECTRIC HEATER
EHL	ELECTRIC HEAT LIMIT
EXM	EXHAUST MOTOR
FCC	FAN CYCLE CONTROL
TCO	THERMAL CUT OUT
FSC	FAN SPEED CONTROL
GWA	GREENWHEEL ASSEMBLY
GWR	GREENWHEEL RELAY
HPS	HIGH PRESSURE SWITCH
HC	HEAT CONTACTOR
IBM	INDOOR BLOWER MOTOR
LOR	LOCK–OUT RELAY
LPS	LOW PRESSURE SWITCH
OAM	OUTDOOR AIR MOTOR
OFM	OUTDOOR FAN MOTOR
RVS	REVERSING VALVE SOLENOID
WDM	WHEEL DRIVE MOTOR
XFMR	TRANSFORMER

GENERAL NOTES

1. 208/230 VOLTS 60HZ 1–PHASE POWER SUPPLY. SEE DATA PLATE FOR AMPACITY & FUSE SIZE.
2. SPEED TAP – SEE MOTOR NAMEPLATE FOR WIRE COLOR.
3. TRANSFORMER IS FACTORY WIRED FOR 230V OPERATION: FOR 208V INTERCHANGE ORANGE & RED LEADS, INSULATE UNUSED LEADS.
4. GWR SIGNAL (VOLTAGE OPTIONAL, CHECK RELAY FOR CORRECT VOLTAGE)

Figure 3c. Typical Electrical Schematic Diagram
GreenPac™ Heat Pump



ELECTRICAL LEGEND:

BTR	BLOWER TIME RELAY
C	CAPACITOR
CC	COMPRESSOR CONTACTOR
COMP	COMPRESSOR
DFC	DEFROST CONTROLLER
DFR	DEFROST RELAY
EH	ELECTRIC STRIP HEATER
EHL	ELECTRIC HEAT LIMIT
EXM	EXHAUST AIR MOVER
TCO	THERMAL CUT OUT
FSC	FAN SPEED CONTROLLER
GWA	GREENWHEEL ASSEMBLY
GWR	GREENWHEEL RELAY
HPS	HIGH PRESSURE SWITCH
HR	HEAT RELAY
IBM	INDOOR BLOWER MOTOR
LOR	LOCK-OUT RELAY
LPS	LOW PRESSURE SWITCH
OAM	OUTDOOR AIR MOVER
OFM	OUTDOOR FAN MOTOR
RBI	REHEAT BLOWER ISOLATOR
RGR	REHEAT GOVERNING RELAY
RVS	REVERSING VALVE SOLEN.
WDM	WHEELDRIVE MOTOR
XFMR	TRANSFORMER
EMS	ENERGY MANAGE. SYSTEM
ODS	OUTDOOR TSAT
OFR	OUTDOOR FAN RELAY
SR	S CIRCUIT RELAY

GENERAL NOTES:

1. 208/230 VOLT 3Ø 60Hz POWER SUPPLY. SEE DATA PLATE FOR AMPACITY AND FUSE SIZE.
2. SPEED TAP – SEE MOTOR NAMEPLATE FOR WIRE COLORS.
3. TRANSFORMER IS FACTORY WIRED FOR 230 VOLT OPERATION. FOR 208 VOLT OR LOWER VOLTAGES, INTERCHANGE ORANGE AND RED LEADS. INSULATE UNUSED LEADS.
4. GREENWHEEL RELAY COIL SIGNAL. SUPPLY VOLTAGE TO COIL TO DE-ENERGIZE GREENWHEEL ASSEMBLY. CHECK RELAY FOR CORRECT VOLTAGE. MAY BE 24, 120 OR 240VAC, VOLTAGE SPECIFIED BY OTHERS.
5. CONNECT TO YELLOW LEAD ON H600A(DEHUMIDIFICATION SIGNAL). LOCATE IN LOW VOLTAGE SHIELD
6. CONNECT TO WIRE FROM "G" ON THERMOSTAT. DO NOT CONNECT DIRECTLY TO "G" ON LOW VOLTAGE TERMINAL BOARD. APPLIES ONLY TO UNITS WITH REHEAT/DEHUMIDIFICATION. LOCATE INSIDE LOW VOLTAGE TERMINAL SHIELD.
7. CONNECT TO WIRE FROM "O" ON THERMOSTAT. DO NOT CONNECT DIRECTLY TO "O" ON LOW VOLTAGE TERMINAL BOARD. APPLIES ONLY TO UNITS WITH REHEAT/DEHUMIDIFICATION. LOCATE INSIDE LOW VOLTAGE TERMINAL SHIELD.

Figure 3d. Typical Electrical Schematic Diagram
GreenPac HGR™ Heat Pump

1.5 Controls - Standard

Defrost Control (Heat Pumps Only)

The defrost control is designed to control the removal of ice or frost from the outdoor coil of the heat pumps.

De-icing is initiated at a pre-selected time interval (30/45/90 minutes), provided the outdoor coil is below a preset initiation temperature (26°F). The de-icing cycle is terminated as soon as the outdoor coil rises to a preset temperature (56°F) or after a preset length of time.

If the outdoor coil cannot reach the desired preset temperature due to weather conditions, or a malfunction, a “time-safe” termination will occur after ten minutes. This termination of the de-ice cycle will restore the heat pump to the normal heat cycle.

High Pressure Switch

The high pressure switch is located on the system liquid line. It is electrically connected to a lock-out relay which shuts down the system if the refrigerant pressure rises to 400 PSIG. This protects the units if airflow is reduced or lost through the heat transfer surface performing the condenser function.

Although the contacts of the high pressure switch close when the refrigerant pressure falls to approximately 300 PSIG, the system must be manually reset once the lock-out relay is activated. A manual reset is necessary to prevent harmful short-cycling. To reset switch, turn primary power off, then back on or turn thermostat system switch off, then back on.

Loss of Charge (Heat Pumps Only)

The loss of charge switch is located on the system’s liquid line and when tripped, activates the lock-out relay and shuts down the system. This switch protects the heat pump if there is a loss of refrigerant. A manual reset is needed to restart the unit. To reset switch, turn primary power off, then back on or turn thermostat system switch off, then back on.

Low Pressure Switch (Air Conditioners Only)

The low pressure switch is mounted on the compressor suction line. It is designed to open if the refrigerant pressure drops to 35 PSIG; it resets when the pressure rises to 60 PSIG. The switch protects the unit if airflow through the indoor blower is impeded, if the blower motor fails, or if there is a loss of refrigerant.

When tripped, the low pressure switch activates the lockout relay and shuts down the system. A manual reset is needed to restart the unit. To reset switch, turn primary power off, then back on or turn thermostat system switch off, then back on.

Lock-out Relay

The lock-out relay prevents the unit from cycling on the pressure switches by providing positive shut-down if the loss of charge or high pressure limits are exceeded. On certain thermostats, an LED will light up on the thermostat during this condition to indicate compressor fault. Once triggered, the relay must be manually reset.

GreenWheel® ERV Intake & Exhaust Single Blower Control

Used to adjust the speed of the two blowers to vary the outside air being brought into the classroom and the classroom air that is exhausted.

1.6 Options

Compressor Time Delay

Prevents compressor from short cycling. Field or factory installed. Available on all units.

Start Relay and Capacitor (Hard Start Kit)

Used on single phase equipment to give the compressor higher starting torque under low voltage conditions. Field installed. Available on all units. (Not recommended for use on scroll compressor.)

Adjustable Outdoor Thermostat (Heat Pumps Only)

Will not allow electric resistance heat to be energized unless the outdoor temperature is below the desired set point. Field or factory installed. Available on all heat pumps.

Evaporator Variable Fan Speed Control

Manual speed control of indoor blower motor provides adjustable air volume. Field or factory installed. Available on all units. (Warning: Minimum air flow is required for proper operation.)

"S" Circuit (Heat Pumps Only)

Limits the electric demand by preventing simultaneous operation of the compressor and electric strip heat; requires only one field power circuit in most cases. Factory installed. Available on all heat pump units.

Factory Installed Disconnects

Available for all 460V, 3ø units.

Energy Management System (EMS) Relay Kit

Relay to control the unit. Available in 24, 120 or 240 VAC. Field or factory installed.

Variable Fan Speed Control for GreenWheel® ERV Exhaust Blower

Variable speed control of GreenWheel® ERV exhaust blower for separate control of the exhaust blower. When used, the standard speed controller control the intake blower and the optional, second controller operates the exhaust blower. Individual blower control allows positive pressurization of the classroom. Field installed, P/N S/03335. Can be factory installed.

Single Point Feed

When multiple internal disconnects are used, single point feed permits only one field power supply to heat pump. Field installed. Available on all units.

Scroll Compressor

All ratings shown on this product data sheet are for the standard reciprocating compressor. Use of a scroll compressor may change the ratings. Available on most units. (Please contact the factory for specific information.)

Chapter 2

Installation

2.1 Equipment Inspection

Concealed Damage

Inspect all cartons and packages upon receipt for damage in transit. Remove cartons and check for concealed damage. Important: Keep the unit upright at all times. Remove access panels and examine component parts. (Note: The bottom bracket is stored in the condenser air compartment. Remove it before replacing the side screen). Inspect refrigerant circuit for fractures or breaks. The presence of refrigerant oil usually indicates a rupture. If damage is apparent, immediately file a claim with the freight carrier.

Units that have been turned on their sides or tops may have concealed damage to compressor motor mounts or to the oil system. If the unit is not upright, immediately file a claim for concealed damages and follow these steps:

1. Set unit upright and allow to stand for 24 hours with primary power turned on.
2. Attempt to start the compressor after 24 hours.
3. If the compressor will not start, makes excessive noise, or will not operate, return the unit to the freight carrier.

General

1. Inspect unit for completeness. Check for missing parts (e.g. hardware). Refer to the installation kit information in section 2.3.
2. Remove access panels and check for loose wires. Tighten screw connections.
3. Complete and mail the warranty registration card.

2.2 Installation Requirements

You must consider all of the following when choosing the installation site:

1. **Noise.** Install the unit so that the least amount of noise will be transmitted to inhabited spaces.
2. **Condensate Drainage**. Condensate produced during operation must be discharged to a suitable drain.
3. **Defrost Drainage.** Ice build up sometime occurs during the heating cycle while in heat pump operation. The automatic reversal (defrost control) of the heat pump cycle causes the ice to melt so that the heat pump may operate efficiently. Please keep this in mind while locating unit.
4. **Placement.**

   A) Place the unit in a shaded area, if possible.

   B) Install it above ground for protection against flooding.

   C) The unit exhausts air. Be sure that the airflow is not impeded by shrubbery or other obstructions.

   D) When installing multiple units, please note the recommended clearances noted in Table 1.

5. **Airflow Requirements.** Note the minimum CFM requirements (section 2.2). Keep duct lengths as short as possible. Do not obstruct airflow through the unit.

   Applications using duct work should be designed and installed in accordance with *all* applicable safety codes and standards. Marvair™ strongly recommends referring to the current edition National Fire Protection Association Standards 90A and 90B *before* designing and installing duct work. The duct system must be engineered to insure sufficient air flow through the unit to prevent over-heating of the heater element. This includes proper supply duct sizing, sufficient quantity of supply registers, and adequate return and filter areas. Duct work must be of correct material and must be properly insulated. The duct must be constructed of galvanized steel with a minimum thickness of .019 inches. Duct work must be firmly attached, secured, and sealed to prevent air leakage. See section 2.4 for additional duct work requirements.

6. **Clearances.** Note the minimum clearances required for proper operation and service. (See table 1 below).

Table 1. Minimum Clearances

Model	Minimum Clearance Around Sides (Single Unit)	Minimum Clearance Between Sides (Two Units)	Minimum Space Above Unit
20/24	30 inches	18 inches	24 inches
30/36	30 inches	18 inches	24 inches
42/48/60	30 inches	30 inches	24 inches

7. **Codes.** Make sure your installation conforms to all applicable electrical, plumbing, building, and municipal codes. Some codes may limit installation to single story structures.

8. **Electrical Supply.** The power supply must have the appropriate voltage, phase, and ampacity for the model selected. Voltage must be maintained above minimum specified values listed below. Refer to the *Electric Heat Ratings* (section 1.2) for ampacity requirements.

Table 2. Voltage Limitations

Electrical Rating Designations*	A	C	D
Nominal Voltage	208/230	208/230	460
Phase	1	3	3
Minimum Voltage	197	187	414
Maximum Voltage	253	253	506

* Letters refer to model number code designations. Refer to page 3.

2.3 Installation Materials

Installation Kits

The GreenPac™ and GreenPac HGR™ air conditioners and heat pumps are shipped with brackets for mounting the unit. All models have built-in side flanges that function as side brackets. All models require and are shipped with a bottom mounting bracket. There is also an air intake hood packed inside each unit.

Standard Kit Components

1. One 12 Ga. “L”-shaped bottom bracket

Accessories

The package may include other factory-supplied items (optional) as follows:

PART #	DESCRIPTION
	Heat Pump Thermostats
50122	Digital thermostat. 2 stage heat, 2 stage cool. Non-programmable. Fan switch: Auto & On. Manual changeover system switch: Cool-Off-Heat-Emergency Heat. Status LED's. °F or °C.
50107	Digital thermostat. 2 stage heat, 2 stage cool. 7 day programmable. Fan switch: Auto & On. Auto-change over. Status LED's. Backlit display. Programmable fan. Non-volatile program memory.
50116	Nonprogrammable electronic heat pump thermostat, 2 stage heat, 1 stage cool. Auto changeover, System switch: Off, Cool, Heat, Emergency heat. Fan Switch: Auto & On Lockable keypad.
50100	Seven day programming. Two occupied and two unoccupied periods per day. Individual heat and cool setpoints. Manual or automatic changeover. System switch: Off, Cool, Heat, Emergency Heat. Fan Switch: Auto & On. Keypad lockout available. Ventilation terminals. No batteries required. Display indicates when Auxilary Heat or Emergency Heat are activated. Requires a 50101 subbase if used on a heat pump or a 50109 if used on an air conditioner.
50101	Subbase to be used with 50100 thermostat for a heat pump.
	Air Conditioner Thermostats
50121	Digital thermostat. 1 stage heat, 1 stage cool. Non-programmable. Fan switch: Auto & On. Manual changeover system switch: Cool-Off-Heat. Low temperature protection. °F or °C.
50123	Digital thermostat. 1 stage heat, 1 stage cool. 7 day programmable. Fan switch: Auto & On. Auto-change over. Keypad lockout. Non-volatile program memory.
50100	Seven day programming. Two occupied and two unoccupied periods per day. Individual heat and cool setpoints. Manual or automatic changeover. System switch: Off, Cool, Heat, Emergency Heat. Fan Switch: Auto & On. Keypad lockout available. Ventilation terminals. No batteries required. Display indicates when Auxilary Heat or Emergency Heat are activated. Requires a 50101 subbase if used on a heat pump or a 50109 if used on an air conditioner.
50109	Subbase to be used with 50100 thermostat for an air conditioner.
	Grilles
80675	VPG - 30S, 28 x 8" Adjustable, Aluminum, Double Deflection Supply Grille for AVP 24-30-36
80676	VPG - 40S, 30 x 10" Adjustable, Aluminum, Double Deflection Supply Grille for AVP 42-48-60
80672	VPG - 30RF, 28 x 14" Aluminum Return Filter Grille for AVP 24-30-36
80673	VPG - 40RF, 30 x 16" Aluminum Return Filter Grille for AVP 42-48-60
	Humidity Controller (Required for GreenPac HGR™ A/C or HP)
50057	Wall mounted type humidity controller controls operation of the hot gas reheat coil for dehumidification. Adjustable dehumidification range.

Additional Items Needed

Additional hardware and miscellaneous supplies (not furnished by Marvair™) are needed for installation. For example, the list below contains approximate quantities of items typically needed for mounting a unit on a wood frame wall structure with standard mounting bracket or flanges. Concrete or fiberglass structures have different requirements.

(10) **3/8" mounting bolts** for side brackets. The length needed is typically the wall thickness plus one inch.
(20) **3/8" washers**
(10) **3/8" hex nuts**
(6) **3/8" x 2-1/2" lag screws** for bottom bracket

- **Silicone Sealer** to seal around cracks and openings
- **7-conductor low voltage multi-colored wire cable** (i.e. thermostat wire)
- **Appropriate electrical supplies** such as **conduit, electrical boxes, fittings, wire connectors,** etc.
- **High voltage wire**, sized to handle the MCA (minimum circuit ampacity) listed on the data plate and in the *Electric Heat Ratings* table in section 1.2.
- **Over-Current Protection Device** sized in accordance with the MFS (maximum fuse size) listed on the unit data plate and in the *Electric Heat Ratings* table in section 1.2.

Duct materials usually are also needed in addition to the mounting hardware. To save time, design the duct work before mounting the unit.

2.4 Porting and Duct Work

General Information

Note: The following instructions are for general guidance only. Due to the wide variety of installation possibilities, specific instructions will not be given. When in doubt, follow standard and accepted installation practices, or contact Marvair™ for additional assistance.

Wall Openings

Measure the dimensions of the supply and return ports on the unit.

Cut the supply opening in the exterior wall for the supply and return. **IMPORTANT: All units with electric heat must have one inch clearance on all four sides of the supply outlet duct flange on the unit. The one inch clearance must extend on all sides of the supply duct for the first three feet from the unit.**

Minimum Airflow Requirements

The duct system must be engineered to assure sufficient air flow through the units, even under adverse conditions such as dirty filters, etc. Proper engineering will insure longevity and maximum performance from the unit.

Ducting

Extensions should be cut flush with the inside wall for applications without duct work.

Applications using duct work should be designed and installed in accordance with *all* applicable safety codes and standards. Marvair™ strongly recommends referring to the current edition of the National Fire Protection Association Standards 90A and 90B *before* designing and installing duct work. The duct system must be engineered to insure sufficient air flow through the unit to prevent over-heating of the heater element. This includes proper supply duct sizing, sufficient quantity of supply registers, adequate return and filter area. Ductwork must be of correct material and must be properly insulated. The duct must be constructed of galvanized steel with a minimum thickness of .019 inches. Ductwork must be firmly attached, secured and sealed to prevent air leakage. Do not use duct liner on inside of supply duct within four feet of the unit.

Galvanized metal duct extensions should be used to simplify connections to duct work and grilles. Use fabric boots to prevent the transmission of vibration through the duct system. The fabric must be UL rated (UL-181) to a minimum of 197°F.

2.5 Bracket Installation

1. Remove and discard the 4” x 4” shipping boards attached to the base of the unit.

2. All models have built-in mounting flanges. See Figure 4.

3. Refer to Figure 4. Attach the bottom support bracket to the wall using appropriate 3/8" diameter hardware.

For example, on wooden structures, use 3/8 x 2-1/2 inch all-thread lag screws. The screws must penetrate the center of the wall stud. Drill a pilot hole in the stud to prevent it from splitting.

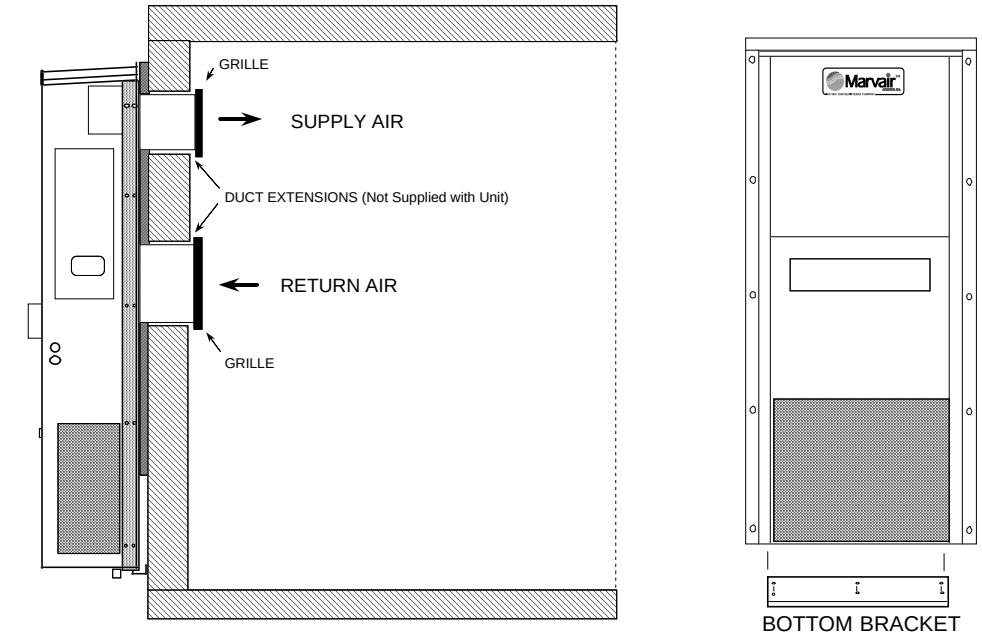


Figure 4. GreenPac™ and GreenPac HGR™ A/C and HP Wall Mounting Detail - AVP24-60

2.6 Mounting The Unit

1. For wiring into the back of unit, locate the lower of the two knock-outs on the wall side of the GreenPac™ and GreenPac HGR™ unit. Drill a one inch hole in the building wall to match this opening. Allow sufficient clearance to run 3/4" conduit through the hole and to the unit.

2. Apply a bead of silicone sealer on the wall side of the mounting brackets on the unit. Circle the mounting holes with the silicone bead.

3. **Using an appropriate and safe lifting device**, set the unit on the bottom support bracket mounted on the wall. You must stabilize the unit on the bracket with the lifting device or by some other means - the bracket alone is not sufficient.

4. Make sure that the duct flanges are properly aligned with the wall opening. Adjust as necessary.

5. Note the holes in each side flange. Using the holes for guides, drill holes through the wall with a 3/8 inch drill bit. Insert the six 3/8” lag screws through the flanges and into the studs. Tighten the bolts to secure the unit.

6. Apply a bead of silicone where the flashing and side flanges contact the unit and the structure wall.

7. On the inside of the structure, wall sleeves may be installed in the supply and return air openings. The sleeves should be trimmed to fit flush with the inside wall.

8. Check the fit of each sleeve to its mating flange for possible air leaks. Apply silicone sealer to close any gaps. Install the air return and supply grilles.

2.7 Electrical Connections

IMPORTANT!

All electrical work must meet the requirements of local codes and ordinances. Work should be done **only** by qualified persons.

The GreenPac™ and GreenPac HGR™ units incorporate an internal crankcase heater for compressor protection. **The crankcase heater must be energized for at least 24 hours prior to starting the compressor.**

High Voltage Wiring

The power supply should have the proper voltage, phase, and ampacity for the selected model.

1. Refer to electrical data stamped on the unit rating plate and to Section 1.2 for field wiring requirements. The electrical data lists heater sizes, fuse sizes, and wire sizes for all models. Also shown are the number for field power circuits required for the various modes with the electric heaters.

   Each unit is marked with a "Minimum Circuit Ampacity". This means that the field wiring used must be sized to carry that amount of current. Use Copper Conductors Only. Refer to the National Electrical Code for complete current carrying capacity data on the various insulation grades of wiring materials.

   Note: Power supply service must be within allowable range (+10% - 5%) of rated voltage stamped on the unit rating plate. To operate nominal 230/208V unit at 208V, change the transformer line tap from 240V to 208V following the instruction on wiring label in unit.

2. Connect the wires to the input side of the internal breaker (L1 & L2 for single-phase units; L1, L2, & L3 for three phase models).

3. Install the ground wire on the ground lug.

Low Voltage Wiring

1. Pull the low voltage wiring from the unit to the thermostat / sub-base assembly.

2. Mount the sub-base on a level plane. Connect the thermostat wire to the unit terminal board and the thermostat as shown in Figure 5.

3. If applicable, attach the thermostat assembly to the sub-base. Check the stage two heat anticipator setting - it should read 0.40.

THE INTERNAL TRANSFORMER IS NOT DESIGNED TO POWER OTHER EXTERNAL DEVICES.

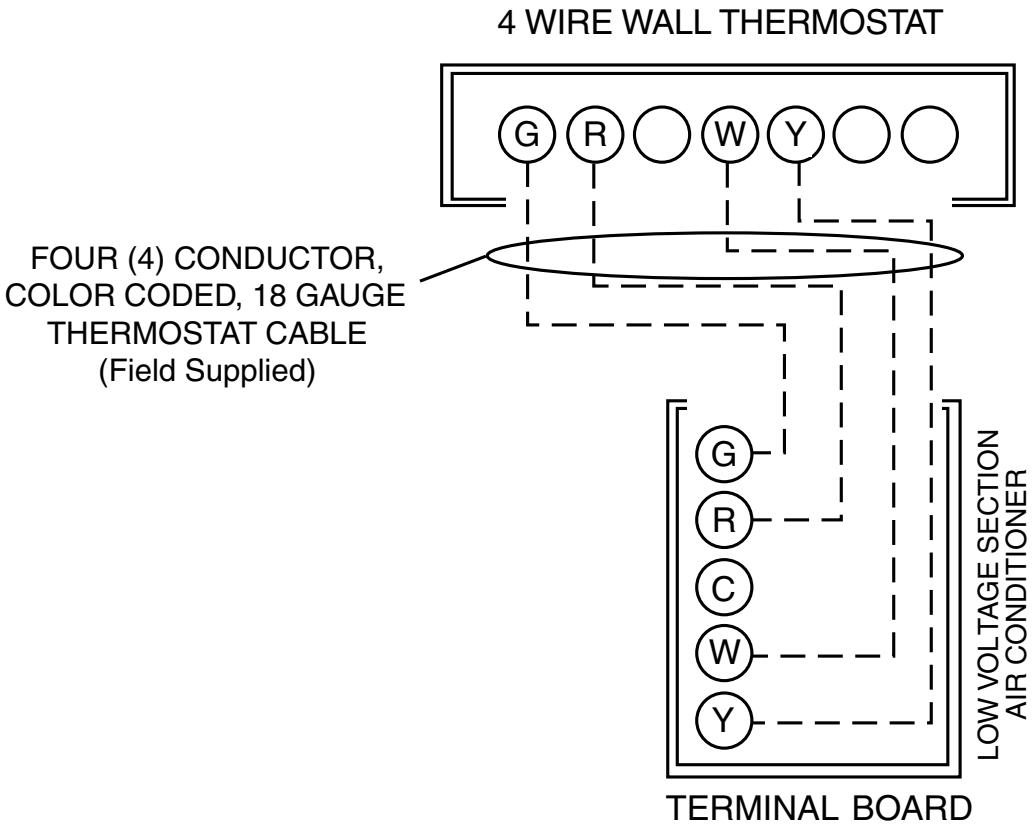


Figure 5a. Thermostat Wiring Detail - Air Conditioners

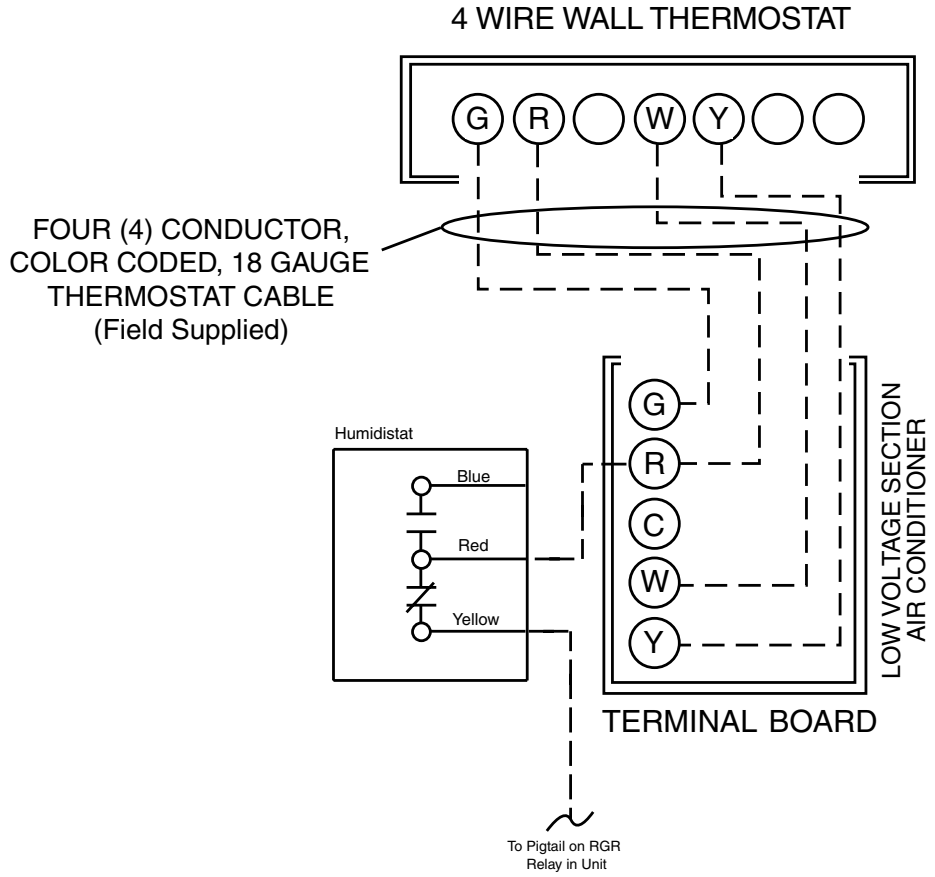


Figure 5b. Humidity Control Wiring Detail - Air Conditioners

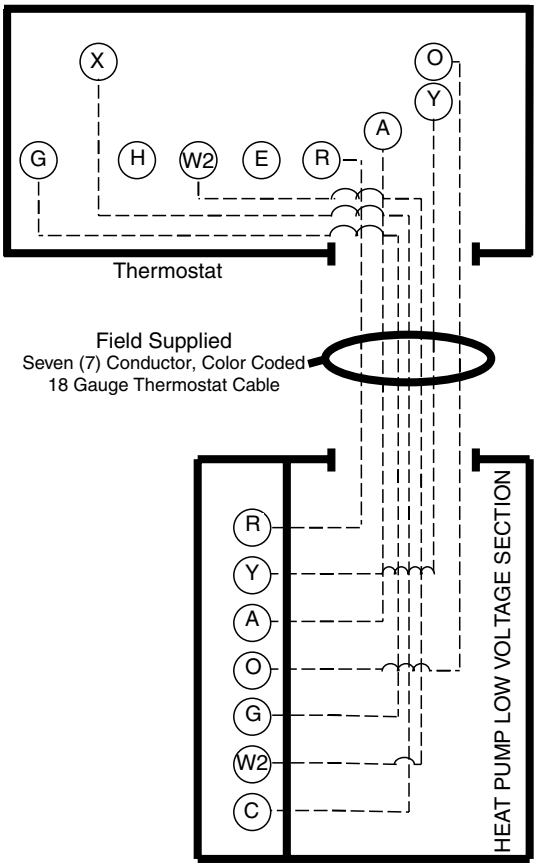


Figure 5c. Thermostat Wiring Detail - Heat Pumps

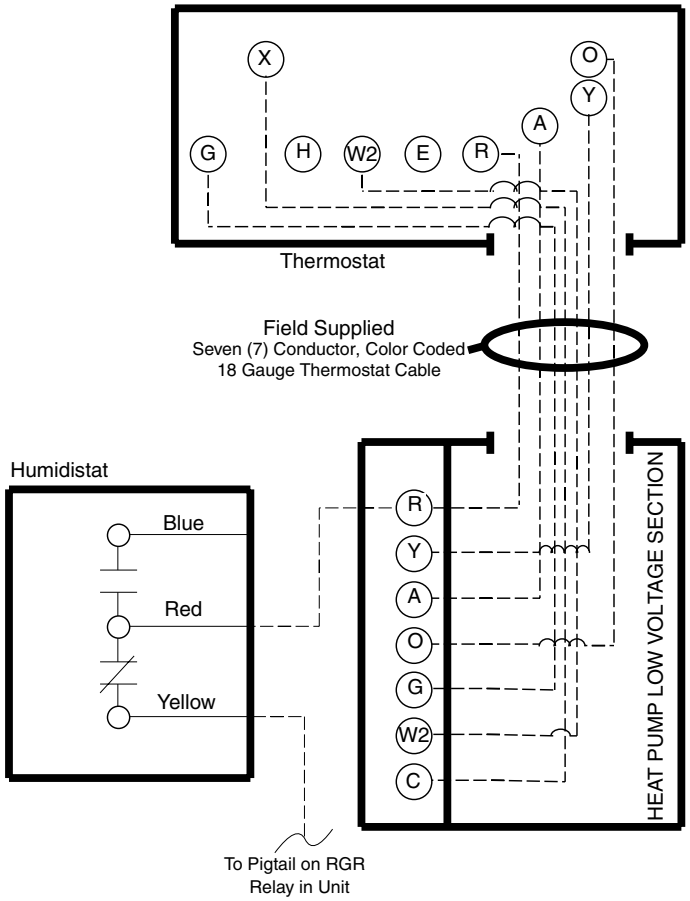


Figure 5d. Humidity Control Wiring Detail - Heat Pumps

Chapter 3

Start-Up

Important: Be sure that the crankcase heater has been energized for at least 24 hours prior to start-up of the unit. Double check all electrical connections before applying power. Various thermostats can be used to control the heat pump. The thermostat may have a fan switch with an Automatic and On positions, a system switch with Heat, Cool, and Off positions, and an emergency heat position with lights. The Product Data Sheets have detailed description of the various Marvair thermostats. Since other thermostats or remote control systems may be used, the following procedures should be viewed as guidelines for standard thermostats with system and fan switches.

3.1 Check-Out of Cooling Cycle

Procedure:

1. Set the fan switch to "Auto" and the system switch to "Off".
2. Move the cooling temperature selection lever on the wall thermostat to a point *higher* than the room temperature. Move the heating temperature selection lever to a temperature that is *lower* than the room temperature.
3. Set the thermostats system switch to "Cool" or "Auto" position. Nothing should operate at this time.
4. Set the time delay in the control box to three minutes. Note that the time delay is an option on the GreenPac™ and GreenPac HGR™ A/C or HP and may not be on your unit.
5. Remove the cover plate from the thermostat to expose the mercury switches. Slowly lower the thermostat cooling temperature selection lever until the top mercury bulb switch closes. Once the indoor fan turns on, allow approximately three minutes for the compressor and outdoor fan to start.

For units equipped with the low ambient control, note that the outdoor fan may not come on immediately, because it is cycled by refrigerant pressures. Some units have a time delay module which prevents the compressor from restarting immediately after interruption of power. See section 1.6 for details on the operation of the time delay.

If the unit fails to operate, refer to the troubleshooting information in Chapter 4.

3.2 Check-Out of Heating Cycle

Procedure (Heat Pumps Only):

1. Place the thermostat system switch to "Auto" or "Heat" and the fan to "Auto".
2. Raise the heating temperature selection lever to a setting which is higher than the room temperature. The compressor should cycle on after time delay has cycled.
3. Move the system switch to the "Off" position. All functions should stop.

The Blower Timed Delay Relay (BTR) keeps the blower running for 90 seconds after the unit shuts off.

Procedure (Resistive Elements):

1. Raise the heating temperature selection lever to a setting which is higher than the ambient temperature. The fan and electric heat should immediately cycle on.
2. Move the system switch to the "OFF" position. All functions should stop.

3.3 Fresh Air Adjustment

Fresh Air Adjustment

Using best industry standards and practices, measure the fresh air that is being brought into the classroom. For units with one speed controller (std.), adjust the speed of the intake and exhaust blowers by inserting a slotted screw driver into the opening on the controller. The speed controller is located on the lower right side of the GreenWheel® ERV assembly. Access to the speed controller is through the return air grille. Measure the intake air again and adjust the speed of the blowers. Repeat as necessary to meet the fresh air requirements.

For units with the optional variable fan speed controller for the GreenWheel® ERV exhaust blower, first measure the air being introduced into the classroom using best industry standards and practices. Adjust the speed of the intake air GreenWheel ERV blower until the required outside air is being brought into the classroom.

Now measure the exhaust air from the classroom. Adjust the speed of the exhaust air GreenWheel® ERV blower until the required air is being exhausted from the classroom. The exhaust air controller is located on the lower left side of the GreenWheel ERV assembly. Access to the exhaust air controller is through the return air grille. It is usual practice to pressurize the classroom by exhausting slightly less air than is being brought into the classroom.

3.4 Evaporator Variable Fan Speed Controller

Evaporator Variable Fan Speed Controller (Optional)

Indoor evaporator fan controller is accessed through the return air opening. The controller is located on the GreenWheel® ERV assembly on the air separation box in a 2” x 4” “J” box.

Note: Sufficient airflow is required for proper operation of the unit.

Chapter 4

Troubleshooting

4.1 Overview

A comprehensive understanding of the operation of the GreenPac™ and GreenPac HGR™ air conditioners and heat pumps is a prerequisite to troubleshooting. Please read the Chapter 1 for basic information about the unit.

Marvair™ GreenPac™ and GreenPac HGR™ units are thoroughly tested before they are shipped from the factory. Of course, it is possible that a defect may escape undetected, or damage may have occurred during transportation. However, the great majority of problems result from installation errors.

If you experience difficulties with the GreenPac™ or GreenPac HGR™ units, please review the installation steps in Chapter 2.

Much time can be saved by taking a thoughtful and orderly approach to troubleshooting. Start with a visual check - are there loose wires, crimped tubing, missing parts, etc.? Begin deeper analysis only after making this initial inspection.

The troubleshooting information in this manual is basic. The troubleshooting section contains problem / solution charts for general problems, followed by a compressor section.

Not every problem can be anticipated. If you discover a problem that is not covered in this manual, we would be very grateful if you would bring it to the attention of our service department for incorporation in future revisions.

As always, please exercise caution and good judgement when servicing the GreenPac™ or GreenPac HGR™ units. Use only safe and proven service techniques. Wear safety goggles when servicing the refrigeration circuit.

The refrigerant circuit has hot surfaces, and the electrical voltages inside of the unit may be hazardous or lethal. SERVICE SHOULD BE PERFORMED *ONLY* BY QUALIFIED AND EXPERIENCED PERSONS.

If replacement of a part is required, use only parts provided or purchased from Marvair™ or authorized by Marvair as a suitable replacement. Use of unauthorized parts may be hazardous and void the warranty.

4.2 Failure Symptoms Guide

PROBLEM/SYMPTOM	LIKELY CAUSE(S)	CORRECTION
A. Unit does not run. NOTE: An internal compressor time delay will prevent the unit from starting for .2 to 8 minutes following start-up.	1. Power supply problem.	1. Check power supply for adequate phase and voltage. Check wiring to unit and external breakers or fuses.
	2. Tripped internal breaker.	2. Check circuit protection devices for continuity.
	3. Shut off by external thermostat or thermostat is defective.	3. Check operation of wall-mounted thermostat.
	4. Unit off on high pressure or loss of charge.	4. Reset lockout. See section 1.6.
	5. Internal component or connection failure.	5. Check for loose wiring. Check components for failure.
B. Unit runs for long periods or continuously; cooling is insufficient.	1. Unit undersized for job.	1. Add additional units for greater capacity.
	2. Low refrigerant.	2. Check for proper charge and possible refrigerant leak.
	3. Component failure.	3. Check internal components, especially compressor for proper operation.
	4. Dirty filter or reduced airflow.	4. Check air filter(s). Check blower operation. Remove airflow restriction.
C. Unit cycles on high pressure or loss of charge.	1. Loss or restriction of airflow.	1. Check blower assembly for proper operation. Look for airflow restrictions, e.g., the air filter. Check blower motor and condenser fan.
	2. Restriction in refrigerant circuit.	2. Check for blockage or restriction, especially filter drier and capillary tube assembly.
	3. Refrigerant overcharge (following field service).	3. Evacuate and recharge to factory specifications.
	4. Defective high pressure control or loss of charge switch.	4. Check limit cut-out pressures. Control is set to actuate at 35 PSIG (loss of charge) and 400 PSIG (high pressure).

PROBLEM/SYMPTOM	LIKELY CAUSE(S)	CORRECTION
D. Unit blows fuses or trips circuit breaker.	1. Inadequate circuit ampacity.	1. Note electrical requirements in Chapter 2 and correct as necessary.
	2. Short, loose, or improper connection in field wiring.	2. Check field wiring for errors.
	3. Internal short circuit. Loose or improper connection(s) in unit.	3. Check wiring in unit. See wiring and schematic diagrams. Test components (especially the compressor) for shorts.
	4. Excessively high or low supply voltage or phase loss (3ø only).	4. Note voltage range limitations specific to the compressor troubleshooting section.
E. Water on floor near unit.	1. Obstruction in condensate line.	1. Check for clog or restriction.
	2. Obstruction or leak in condensate pan.	2. Check pan for leak or blockage.
	3. Unit is not level.	3. Level unit.
F. No space heating or reduced heating (units equipped with resistance elements).	1. Defective heating element(s).	1. Check resistance element(s) for continuity.
	2. Thermal limit switch open.	2. Check continuity across thermal limit switch.
	3. Defective heater relay.	3. Check relay for proper operation.
	4. Open thermal cut-out (TCO).	4. Check across TCO (adjacent to element(s) for continuity. It is normally closed.
	5. Thermostat set too low.	5. Adjust thermostat.
	6. Compressor fault.	6. Reset the lock out relay at the thermostat.

4.3 Compressor Troubleshooting

MODEL	COMPRESSOR MODEL	RLA	LRA	RUN CAP. MFD	COMP. WINDINGS OHMS (1 Ph) C-R	C-S	S-R
24	H25B	9.6	61	35	0.957	2.840	3.797
30	H25B	11.5	73	35	0.793	2.720	3.513
36	H25B	14.2	94	45	0.626	1.930	2.556
36 Alt.	AV5533E	13.5	79	45	N/A	N/A	N/A
42	H25B	14.7	87	45	0.537	1.060	1.597
42 Alt.	AV5538E	15.4	98	45	N/A	N/A	N/A
48	H25A	19.0	135	55	0.356	0.740	1.096
60	H25A	22.0	135	60	0.356	0.740	1.096

It is important to rule out other component failures before condemning the compressor.

The following electrical tests will aid diagnosis on single phase "HPA" units:

1. **Start-Up Voltage**: Measure the voltage at the compressor terminals during start-up. The voltage must exceed the minimum shown in Table 8, section 2.2, or compressor failure is likely. A low voltage condition must be corrected.
2. **Running Amperage**: Connect a clip-on type ammeter to the (common) lead to the compressor. Turn on the supply voltage and energize the unit. The compressor will initially draw high amperage; it should soon drop to the RLA value or less. If the amperage stays high, check the motor winding resistances.

   NOTE: Feel the top of the compressor to see if it has overheated. If it is hot, the internal overload may be open. You may have to wait several hours for it to reset.
3. **High Voltage/Insulation Test:** Test internal leakage with a megohmeter. Attach one lead to the compressor case on a bare metal tube and to each compressor terminal to test the motor windings. A short circuit at a high voltages indicates a motor defect. Do not do this test under vacuum.
4. On single phase models, check the capacitor by substitution.

Chapter 5

Parts List

5.1 Parts List

REV. 1		GREENPAC™ HEAT PUMPS						NOTES
ITEM	DESCRIPTION	24	30	36	42	48	60	
	Designators	B1	B1	B1	B1	C1	C1	
1	Compressors							
	HPA - 208/230V, 1 Ph	10060	10071	10057	10111	10035	10047	
	HPC - 208/230V, 3 Ph	P/10000	10072	10058	10112	10036	10048	
	HPD - 460V, 3 Ph	10062	10073	10059	10113	10037	10049	
2	P.T.C.R. (1PH UNITS only)				50286	50286	50285	4
3	Compressor Capacitor	50280	50280	50321	50321	50322	50323	
	Designators	C1	C1	C1	C1	D1	D1	
1	Compressors							
	HPA - 208/230V, 1 Ph			10183*		10188**\	10191**	* 2, **3
	HPC - 208/230V, 3 Ph			10185*		10189**\	10192**	* 2, **3
	HPD - 460V, 3 Ph			10184*		10190**	10193**	* 2, **3
3	Compressor Capacitor			50321*		50323	50315(2)	
4	Compressor Contactor							
	HPA- (1PH)	50020	50020	50020	50020	50030	50030	
	HPC,HPD-(3PH)	50040	50040	50040	50040	50040	50040	
5	Condenser	60209	60380	60380	60370	60355	60355	
6	Outdoor Motor Capacitor	50350	50350	50350	50240	50240	50240	
7	Indoor Motor Capacitor	50350	50350	50350	50360	50360	50360	
8	Filter-(Organic Media)	80192	80192	80192	80192	80192	80192	
9	Indoor Blower-LH	30060	30050	30050	30090	30090	30090	
10	Indoor Blower-RH	30065	30055	30055	30092	30092	30092	
11	Indoor Motor (IBM)	40045	40055	40055	40099	40099	40099	
12	Orifice-Cooling-("H" only)	20082	20094	20093	20081	20079	20078	
13	Distributor-Indoor-("H" only)	20118	20117	20117	20117	20116	20116	
14	Evaporator Coil	60207	60385	60385	60360	60340	60340	
15	Heating Element							
16	TCO (Thermal Cut-Out)	80053	80053	80053	80053	80053	80053	
17	Limit Switch	70070	70070	70070	70070	70070	70070	
18	Accumulator	70320	70320	70320	70330	70340	70340	
19	Control Transformer	50141	50141	50141	50141	50141	50141	
20	Blower Time Delay Relay (BTR)	50420	50420	50420	50420	50420	50420	
21	Terminal Board (TB)	80825	80825	80825	80825	80825	80825	
22	Terminal Block-3P	80800	80800	80800	80800	80800	80800	
23	Terminal Block-2P	80812	80812	80812	80812	80812	80812	
24	Outdoor Fan Motor	40031	40096	40096	40098	40098	40098	
25	Fan Blade	30110	30115	30115	30135	30135	30135	
26	Orifice-heating("H"and"HG")	20103	20077	20083	20076	20066	20069	
27	Distributor-Outdoor("H"and"HG")	20119	20119	20119	20119	20121	20121	
28	Lockout Relay (LOR)	50214	50214	50214	50214	50214	50214	
29	High Pressure Switch	70080	70080	70080	70080	70080	70080	
30	Loss of Charge Switch (LPS)	70050	70050	70050	70050	70050	70050	
31	Motor Mtg. Bracket (OFM)	80420	80420	80420	80426	80426	80426	
32	Motor Mtg. Bracket (IBM)	80427	80427	80427	80428	80428	80428	
33	Defrost Control	20173	20173	20173	20173	20173	20173	
34	Transformer (460v)	50147	50147	P/50007	P/50007	P/50007	P/50007	
35	Reversing Valve	20135	20135	20135	20135	20135	20135	
36	Reversing Valve Solenoid	50225	50225	50225	50225	50225	50225	
37	Filter Drier	70388	70388	70388	70388	70388	70388	
38	Relays							
39	Terminal Lug	80271	80271	80271	80271	80271	80271	
40	Circuit Breaker-60 AMP-(HPA)	70178	70178	70178	70178	70178	70178	
	Circuit Breaker-60 AMP-(HPC)	70183	70183	70183	70183	70183	70183	
	Circuit Breaker-40 AMP-(HPD)	70299	70299	70299	70299	70299	70299	1
	GREENWHEEL® ERV ASSY							
41	Blower/Motor assy	40015	40015	40015	40015	40015	40015	
42	Drive Motor	40007	40007	40007	40007	40007	40007	
43	Energy Recov.Wheel	01226	01226	01226	01226	01226	01226	
44	Pulley	80372	80372	80372	80372	80372	80372	
	Drive Belt	P/80390	P/80390	P/80390	P/80390	P/80390	P/80390	
	GREENPAC HGR™ A/C & HP (Only)							
45	Reheat Coil	60051	60051	60051	60051	60051	60051	
46	Expansion Valve	20224	20228	20032	20032	20222	20226	
47	Distribuor	20223	20221	20221	20221	20219	20227	
48	Check Valve-5/8"	20029	20029	20029	20029	20029	20029	
49	Valve-3 way Diverting	20257	20257	20257	20257	20257	20257	
50	Solenoid Valve	20028	20028	20028	20028	20028	20028	

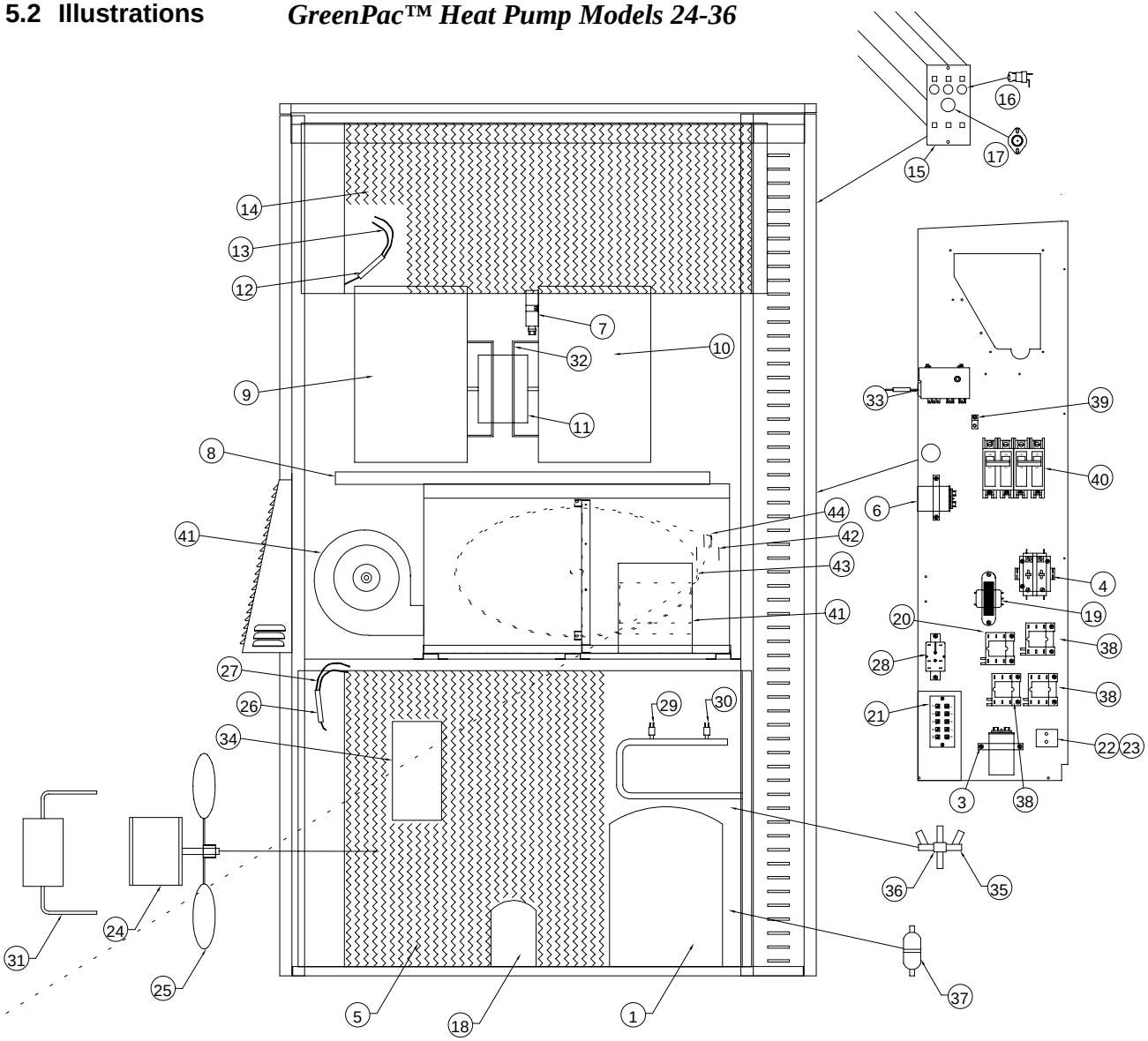
NOTES

1=Optional 2 = Reed Valve 3 = Scroll 4 = PTCR - Start Capacitor

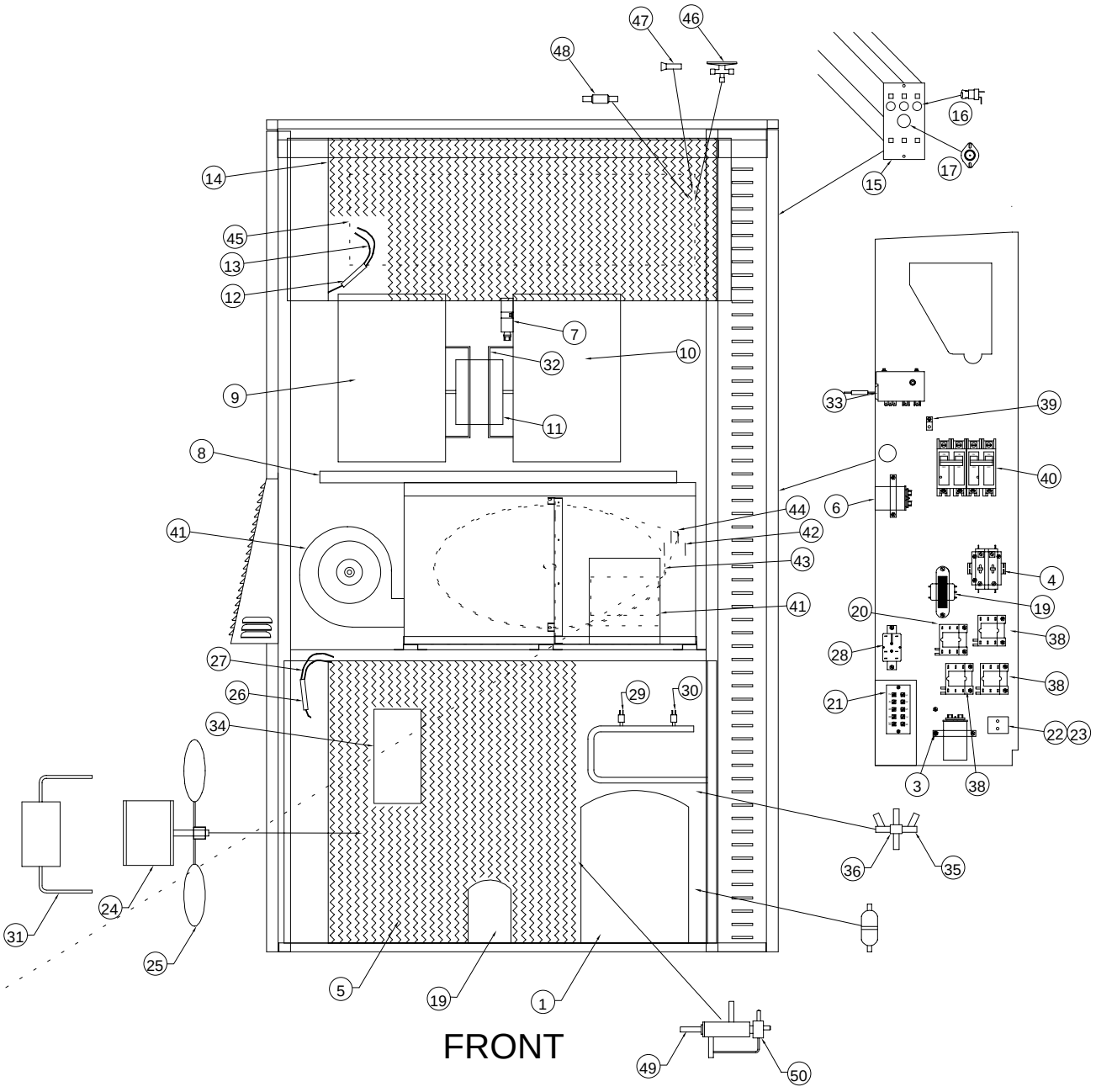
HEATING ELEMENT CHART								
UNITS		ELEMENTS	CONTACTOR/RELAYS			HGR RELAYS		
KW	VOLTS	PART	HEAT	DFR	GWR	RBI	RGR	RHR
0	240			50200	50511	50511	50511	50810
4	240	70141	50020	50200	50511	50511	50511	50810
5	240	70142	50020	50200	50511	50511	50511	50810
6	240	70168	50040	50200	50511	50511	50511	50810
8	240	70144	50030	50200	50511	50511	50511	50810
9	240	70145	50040	50200	50511	50511	50511	50810
10	240	70147	50030	50200	50511	50511	50511	50810
15	240	70149	50040	50200	50511	50511	50511	50810
0	460				50511	50511	50511	50810
6	460	70198	50040	50200	50511	50511	50511	50810
9	460	70196	50040	50200	50511	50511	50511	50810
15	460	70197	50040	50200	50511	50511	50511	50810
* For Relay P/N 50511					SOCKET* 50501			50811

5.2 Illustrations

GreenPac™ Heat Pump Models 24-36



FRONT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Chapter 6

Maintenance

6.1 Scheduled Maintenance

Marvair™ strongly recommends that the air conditioner be serviced a minimum of twice a year – once prior to the heating season and once prior to the cooling season. At this time the filters, evaporator coil, condenser coil, the cabinet, and condensate drains should be serviced as described below. Also at this time, the unit should be operated in the cooling and heating cycles as described in Chapter 3, Start-Up. In addition to this seasonal check-out, the GreenPac™ & GreenPac HGR™ units should be maintained as follows:

Air Filter

Inspect the filters monthly. Clean the fresh air filters and replace the return air filter whenever they are visibly dirty.

Evaporator

If the evaporator becomes clogged or dirty, it may be cleaned by careful vacuuming or with a commercial evaporator cleaning spray. DO NOT use a solvent containing bleach, acetone, or flammable substances. Turn power off before cleaning. Be careful not to wet any of the electrical components. Be sure the unit has dried before restarting.

Condenser

Periodically inspect the outdoor condenser coil and the cabinet air reliefs for dirt or obstructions. Remove foreign objects such as leaves, paper, etc.

If the condenser coil is dirty, it may be washed off with a commercial solvent intended for this purpose. TURN OFF POWER BEFORE CLEANING! Be sure that all electrical components are thoroughly dry before restoring power.

Cabinet

The cabinet may be cleaned with a sponge and warm, soapy water or a mild detergent. Do not use bleach, abrasive chemicals or harmful solvents.

Drains

Regularly check the condensate drain. An obstruction will force water to dump into the middle of the unit and drain out the sides of the unit, causing discoloration of the side panels. If discoloration is noted, service the drain.

If a commercial drain solvent is used, flush out the drain pan and system with plenty of fresh water to prevent corrosion.

GreenWheel® ERV

Bearings - The GreenWheel® ERV is provided with no maintenance inboard bearings. These ball bearings should require no maintenance during the life of the equipment.

Drive Motor - The drive motors should require no maintenance. Replacement motors may be purchased from Marvair™.

Drive Belts - GreenWheel® ERV belts are constructed of a high performance polyurethane elastomer. This belt provides a strong, yet flexible belting.

Seals - The seals are designed to be durable and require no maintenance other than adjustment, but if seals become worn or damaged they may easily be replaced. The seals are made to clip on the cassette or post metal easily. Call Marvair™ for servicing information.

Wheel - The wheel is designed to last the life of the equipment. It should be protected by a filter to keep dust and dirt from the heat transfer surface. The wheel is somewhat self cleaning through its normal action of rotating in and out of counter-current air flow streams. If the wheel becomes dirty, it may be cleaned by blowing out the unit with compressed air (20 psig maximum). When the wheel becomes extremely dirty, the wheel may be removed from the cassette and washed with water following wheel removable procedures outlined below:

1. Remove air handler plenum sections so that the front or back of the cassette may be easily accessed and cleared.
2. Unbolt the shaft screw on both sides of the shaft. Unbolt one post completely and remove post. Remove the snap ring (on 90° models only) at the face of the hub. Remove the shaft. Pull the wheel off carefully.
3. With the wheel out, wash the media carefully with water. Once clean, allow the media to dry out for several hours or days if necessary.
4. Reinstall using the reverse procedure. Run the unit. It may take several hours for the desiccant to dry out and for the wheel to perform normally.

Chapter 7

Warranty

7.1 Limited Product Warranty

If any part of your Marvair™ Air Conditioner, Heat Pump or Unit Ventilator fails because of a manufacturing defect within fifteen months from the date of original shipment from Marvair or within twelve months from the date of original start-up, whichever is the earlier date, Marvair will furnish without charge, EXW Cordele, Georgia, the required replacement part. Any transportation, related service labor, diagnosis calls, filter, driers, and refrigerant are not included. The owner must provide proof of the date of the original start-up. The owner's registration card filed with Marvair, the contractor's invoice, the certificate of occupancy or similar document are examples of proof of the date of the original start-up.

In addition, if the hermetic compressor fails because of a manufacturing defect within sixty months from the date of original shipment from Marvair™, Marvair will furnish without charge, EXW Cordele, Georgia, the required replacement part. Any related service labor, diagnosis calls, filter, driers and refrigerant are not included. Marvair will pay for non-priority shipping costs of the compressor during the first twelve months of the warranty period. After the first twelve months of the warranty period, all costs of shipment and risk of loss during the shipment of the compressor shall be the responsibility of the owner.

The owner of the product may ship the allegedly defective or malfunctioning product or part to Marvair™, at such owner's expense, and Marvair will diagnose the defect and, if the defect is covered under this warranty, Marvair will honor its warranty and furnish the required replacement part. All costs for shipment and risk of loss during shipment of the product to Marvair and back to the owner shall be the responsibility and liability of the owner. Upon written request by an owner, Marvair may arrange for remote diagnosis of the allegedly defective or malfunctioning product or part but all costs for transportation, lodging and related expenses with regard to such diagnostic services shall be the responsibility and liability of the owner.

An owner requesting performance under this Warranty shall provide reasonable access to the allegedly defective or malfunctioning product or part to Marvair™ and its authorized agents and employees.

This warranty applies only to products purchased and retained for use within the U.S.A., Canada, and Mexico. This warranty does not cover damage caused by improper installation, misuse of equipment or negligent servicing.

THIS WARRANTY CONSTITUTES THE EXCLUSIVE REMEDY OF ANY PURCHASER OF A MARVAIR™ HEAT PUMP OR AIR CONDITIONER AND IS IN LIEU OF ALL OTHER WARRANTIES, EXPRESSED OR IMPLIED, INCLUDING, WITHOUT LIMITATION, ANY IMPLIED WARRANTY OF MERCHANTABILITY OR FITNESS FOR USE, TO THE FULLEST EXTENT PERMITTED BY LAW. IN NO EVENT SHALL ANY IMPLIED WARRANTY OF MERCHANTABILITY OR FITNESS FOR USE EXCEED THE TERMS OF THE APPLICABLE WARRANTY STATED ABOVE AND MARVAIR SHALL HAVE NO OTHER OBLIGATION OR LIABILITY. IN NO EVENT SHALL MARVAIR BE LIABLE FOR INCIDENTAL OR CONSEQUENTIAL DAMAGES OR MONETARY DAMAGES.

THIS WARRANTY GIVES YOU SPECIFIC LEGAL RIGHTS, AND YOU MAY ALSO HAVE OTHER RIGHTS WHICH VARY FROM STATE-TO-STATE. Some states do not allow limitations or exclusions, so the above limitations and exclusions may not apply to you.